FORTY-FIRST ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1913.

BY AUTHORITY

LANSING, MICHIGAN
WYNKOOP HALLENBECK CRAWFORD CO., STATE PRINTERS
1914

LETTER OF TRANSMITTAL.

Office of the
Secretary of the State Board of Health,
Lansing, Michigan, December, 1913.

To the Honorable Woodbridge N. Ferris, Governor of Michigan:

Sir:—In compliance with the laws governing this Board, I have the honor to herewith submit the annual report for the fiscal year ending June 30, 1913.

Very respectfully,

ROBERT L. DIXON,
Secretary and Executive Officer, State Board of Health.

MEMBERS

OF THE

MICHIGAN STATE BOARD OF HEALTH.

	TERM EXPIRES.
VICTOR C. VAUGHAN, M. D., Ph. D., *President*, Ann Arbor	January 31, 1913.
AARON R. WHEELER, M. D., *Vice-President*, St. Louis	January 31, 1913.
EDWARD L. ABRAMS, M. D., Hancock	January 31, 1915.
CHARLES M. RANGER, A. B., Battle Creek	January 31, 1915.
ROBERT L. DIXON, M. D., *Secretary and Executive Officer*, Lansing	March 31, 1917.
THOMAS M. KOON, M. D., Grand Rapids	January 31, 1917.
JOHN H. KELLOGG, M. D., Battle Creek	January 31, 1917.

TABLE OF CONTENTS.

PART I.

REPORT OF THE SECRETARY FOR THE FISCAL YEAR JULY 1, 1912, TO JUNE 30, 1913.

EXTRACTS OF MINUTES OF BOARD MEETINGS.

REGULAR MEETING HELD AT LANSING, JULY 12, 1912.

Members present were: President V. C. Vaughan, M. D.; Thos. M. Koon, M. D.; E. T. Abrams, M. D.; John H. Kellogg, M. D.; A. R. Wheeler, M. D.; Chas. M. Ranger, A. B., and Robt. L. Dixon, M. D., Secretary.

The Secretary asked for an opinion of the Board upon Embalmers' Rule No. 8, and the following resolution was adopted: "This Board will consider bodies not as disinterred bodies until they have been buried thirty days or more."

The Secretary offered a plan for the sending of a State Board of Health exhibit car, during the month of September, 1912, in co-operation with the Dairy and Food Department, and was instructed to continue his arrangements along that line.

Mr. C. M. Ranger was appointed delegate to the next meeting of the National Association of Embalmers, to be held at Chattanooga, Tenn.

Dr. Thos. M. Koon, Dr. A. R. Wheeler and the Secretary were appointed a committee to make investigation of the prisons, reform schools, asylums and other public institutions, for the purpose of ascertaining the sanitary condition of buildings and grounds; methods of dietaries and quality of food and water supplies. The committee was instructed that, with the assistance of Prof. E. D. Rich, Sanitary Engineeer, an early investigation be made of the Industrial Home for Girls, Adrian, Michigan, and a report upon same, with recommendations, made to the State Board of Correction and Charities.

Drs. E. T. Abrams, A. R. Wheeler and J. H. Kellogg were appointed as a committee to take cognizance of all public health matters and to work in connection with other public health branches or organizations and any matters pertaining to public health legislation.

The Secretary was instructed to send out a circular letter to every health officer in the state, enclosing a blank asking the health officer to investigate conditions in relation to railroad stations, such as sanitary condition of toilets, waiting rooms; condition of water supply and other features of sanitation in and about railroad stations and to report upon these investigations to the Secretary of the State Board of Health.

The Secretary brought to the attention of the Board some investigations which had been made by Dr. Clara Davis, in relation to factory sanitation. The board instructed the Secretary to extend to Dr. Davis their hearty appreciation of her services in this particular and to ask that she continue the work, as State Medical Inspector.

Dr. T. M. Koon reviewed in detail the epidemic of typhoid fever at Marquette, Michigan.

The question of County Health Officers was proposed by Dr. V. C. Vaughan, and was referred to the Legislative Committee.

The committee appointed at the last meeting to select a corps of State Medical Inspectors, reported as follows: For the several Congressional districts: Dr. Guy L. Kiefer, Detroit; Dr. J. F. Breakey, Ann Arbor; Dr. A. H. Rockwell, Kalamazoo; Dr. C. N. Sowers, Benton Harbor; Dr. T. M. Koon, Grand Rapids; Dr. R. L. Dixon, Lansing; Dr. W. H. Smith, St. Clair; Dr. A. M. Hume, Owosso; Dr. Geo. Williams, Muskegon; Dr. E. Goodwin, Bay City; Dr. G. W. Petty, St. Louis; Dr. E. T. Abrams, Hancock, and Dr. F. M. Harkin, Marquette.

Mr. Reed Chambers was appointed Assistant Bacteriologist, Vice, Mr. Q. O. Gilbert, whose term of appointment expires October 1, 1912. The salary for Mr. Chambers was fixed at $1,500.

REGULAR MEETING HELD AT LANSING, OCTOBER 11, 1912.

Members present were: President V. C. Vaughan, M. D.; Thos. M. Koon, M. D.; John H. Kellogg, M. D.; Chas. M. Ranger, A. B., and R. L. Dixon, M. D., Secretary.

The Secretary reported that Prof. E. D. Rich had completed his investigation of the Industrial School for Girls, Adrian, Michigan, and was instructed to have copies of the report of Mr. Rich transmitted to the Governor and to the State Board of Correction and Charities.

The Secretary presented in abstract the report of investigation made during the past year by Miss Adele McKinnie and was instructed to publish, in the forthcoming bulletin, Miss McKinnie's report. Dr. E. T. Abrams and the Secretary were appointed as a committee to wait upon the Board of Auditors and urge upon them the necessity of publishing Miss McKinnie's report in full and to request of the Board authority to continue Miss McKinnie's services.

Mr. C. M. Ranger gave an oral report of the National Embalmers' Association meeting at Chattanooga, Tennessee.

Dr. S. Szudrawski, of Manistee, was appointed Medical Inspector for the northern half of the 9th Congressional district.

Ophthalmia Neonatorum was placed upon the list of reportable diseases, as were syphilis and gonorrhea, the latter two to be reported by number or symbol, rather than by patient's name, and the Secretary was instructed to prepare blanks for the reporting of these two diseases.

Dr. E. T. Abrams, with Dr. T. M. Koon as alternative, was appointed delegate to the Conference of American Railroad Surgeons to be held at the Hotel LaSalle, Chicago, October 16, 1912.

The Secretary was instructed to request the Attorney General to have drafted into bills, for consideration by the Board at the forthcoming meeting, various ideas relative to State Board of Health control and supervision over public water supplies, sewage disposal systems, appointment and dismissal of local health officers, establishment of Division of Sanitary Engineering, medical supervision of schools, building code for schools, health officers' conferences and such other propositions as the Board might direct.

The Secretary was instructed to co-operate with the Superintendent of Public Instruction, relative to legislation providing for a school building-code and medical supervision of schools, also to co-operate with the State Board of Registration in Medicine, in legislation tending to place under control the practice of mid-wifery.

The Board endorsed the general proposition brought forth by the Traveling Men's Association, looking toward legislation providing for the establishment and maintenance of sanitary conditions in and about hotels.

The Secretary was instructed to prepare a budget of expenditures such as he might consider the Department would need for carrying on its work during the coming year, so that this budget should be taken into consideration in relation to legislation for increased appropriations.

SPECIAL MEETING HELD AT LANSING, NOVEMBER 20, 21 AND 22, 1912.

Members present: President V. C. Vaughan, M. D.; Thos. M. Koon, M. D.; Chas. M. Ranger, A. B., and Robt. L. Dixon, M. D., Secretary.

Meeting was called for the purpose of conducting an Embalmers' examination. Thirty applicants were examined.

The following text books on Physiology were placed on the accredited list: "Health Series, Book 1, The Child's Day," edited by Woods Hutchinson and published by Houghton, Mifflin Co.; "Physiology and Hygiene," edited by Walters and published by D. C. Heath & Co. The form of blank prepared by the Secretary for the reporting of venereal diseases was accepted by the Board.

The afternoon portion of the first day's session was devoted to a conference with representatives from the various railroad companies, relative to railway sanitation problems. The Board requested that the representatives from each of the following named railroad companies confer with the Secretary of this Board, at a future date, to prepare a bill tending to make regulations for railroad sanitation: Grand Trunk; Pere Marquette; Duluth, South Shore & Atlantic; Grand Rapids & Indiana; Michigan Central and the Michigan United Traction Co.

REGULAR MEETING HELD AT LANSING, JANUARY 10, 1913.

Members present: President V. C. Vaughan, M. D.; Thos. M. Koon, M. D.; J. H. Kellogg, M. D.; Chas. M. Ranger, A. B.; E. T. Abrams, M. D., and Robt. L. Dixon, M. D., Secretary.

Mr. Samuel Pepper, assistant to the Attorney General, appeared before the Board, at their request, to give his opinion upon the proposed bills to introduce at the next session of the legislature. The bills were ultimately agreed upon and the Secretary was instructed to see that they were presented at the next session of the legislature.

Dr. Thos. M. Koon was asked to prepare, for publication by the Board, an article upon infantile scurvy; also each member of the Board was requested to prepare, for publication by the Board, an article upon a subject of his own choosing.

REGULAR MEETING, HELD AT LANSING, APRIL 11, 1913.

Members present were: President V. C. Vaughan, M. D.; Thos. M. Koon, M. D.; Chas. M. Ranger, A. B., and Robt. L. Dixon, M. D., Secretary.

A report upon the progress of legislation was given by the Secretary.

President V. C. Vaughan was appointed delegate to the coming convention of the National Association for Study and Prevention of Tuberculosis, to be held at Washington, D. C.

Drs. Thos. M. Koon and Robt. L. Dixon were appointed delegates to the meeting of the American Medical Association, at Minneapolis, Minn., and the International Congress on School Hygiene, at Buffalo, N. Y., respectively.

At this meeting, Dr. V. C. Vaughan was re-elected President and Dr. Thos. M. Koon, Vice-President of the Board.

The question of securing a car and crew for a traveling Health exhibit was considered and referred to the Secretary.

The Board decided to conduct a Health exhibit at the West Michigan Fair, Grand Rapids, Sept., 1913.

EXAMINATION AND LICENSING OF EMBALMERS.

Under the provisions of Act No. 132, Laws of 1903, two examinations were held during the fiscal year ending June 30, 1913, as follows:

Lansing, July 10, 11 and 12, 1912. Lansing, November 20, 21 and 22, 1912.

Of the 84 persons examined, 43 were granted licenses.

Reciprocal licenses were granted in 13 instances.

A statement of expenses incurred in the operation of Act 132, Laws of 1913, may be found on a subsequent page of Part I of this report.

The following letter, issued in November, 1912, will serve to show the scope of the embalmers' examination, and the conditions to be complied with on the part of the applicants for examination:

STATE BOARD OF HEALTH.

OFFICE OF THE SECRETARY, LANSING.

To the Funeral Directors and Embalmers.

GENTLEMEN:

You are hereby informed that a meeting of the State Board of Health, called for the purpose of conducting an embalmers' examination, will be held in the Senate Chamber, Lansing, November 20, 21 and 22, 1912. The examination will commence at 9 o'clock, on the morning of November 20.

Candidates will be required to take both *written* and *oral* examinations with demonstration on the cadaver. Oral examinations will be given in the order applications are received. Some of the general subjects included in the written examinations are:

(a) Visceral anatomy and the circulation of the human body, both arterial and venous.

(b) The nature, action, modes of action and comparative value of disinfectants.

(c) The method of embalming and preparing bodies for transportation, also shipping rules.

(d) How diseases are spread; the best method for the restriction of diseases, and bacteriology in relation to the spread of diseases.

(e) The signs of death and the manner in which it is determined.

Those who desire to take the examination at this time must fill out and return to the Secretary of the Board, the enclosed application blank, with an unmounted photograph of the applicant, signed in ink on the back, and properly certified to by a notary. A fee of five dollars must accompany the application. Remittances

may be made by express or postoffice money order or by registered letter. *Personal checks cannot be used.*

Applications should be on file in this office *one week* before the date of examination.

Application must be made in the name of an individual, and not of a firm.

Applicant's name must be signed in full.

In the examination, a rating of at least seventy-five per cent must be made by the applicant to secure a license.

By direction of the State Board of Health.

R. L. DIXON,
Secretary.

GENERAL AND SPECIAL WORK IN THE OFFICE OF THE SECRETARY.

Much of the general work of the office naturally groups itself under three heads: the collection of information, the compilation of information so collected, and the dissemination of such information as will be of service in the restriction and prevention of disease.

COLLECTION OF INFORMATION.

As the local health officer is the principal medium by which this Department may reach and instruct the public in matters pertaining to the prevention of sickness and deaths, the appointment, and the return of the names and postoffice addresses of the health officers, in each year, are matters of more than ordinary interest and importance.

In each year, it is often necessary to make a first, second and third request for information which will place this office in communication with the local health officers, and during the time which is thus used up in corresponding and waiting, an outbreak of a dangerous disease may begin and become widespread before this office can afford the usual assistance to the proper officials in the locality.

It should be said, however, that there is an increasing tendency to comply with the law in this particular, and local boards of health now generally act promptly and co-operate cordially with this Department for the suppression of disease.

Having established communication with the newly appointed local health officers, pamphlets and other publications which may aid them in their work, together with the usual blanks for reports of outbreaks of diseases in their locality, are mailed from this Department. In some instances, considerable correspondence is necessary to instruct the health officials how to properly care for sick and infected persons, and to make reports which will be of value in the compilations for the annual reports and other publications of this Department.

In addition to the collection of the usual information relative to outbreaks of dangerous communicable diseases in this State, special information upon subjects of public interest and importance is sometimes asked for and is usually cheerfully furnished by a large number of health officers and other persons from whom the information is sought.

DISSEMINATION OF INFORMATION.

As stated in the preceding paragraph, each newly appointed health officer is supplied, by this Department, with information relative to his duties. This information is contained principally in a pamphlet entitled "Health Officers' Manual," and in pamphlets covering the principal points in the etiology and methods of restriction and prevention of each of the dangerous communicable diseases.

Upon the receipt of information relative to an outbreak of a dangerous communicable disease, in addition to the usual instructions and blanks for making the reports, there are mailed to the health officers a sufficient number of pamphlets, relative to the particular disease then present, for distribution to the families and immediate neighbors of the sick person. In this way, the people are educated as to their duty, under the law, and their co-operation with the local health officers often secured.

A pamphlet covering the law respecting nuisances, and containing information relative to their suppression, is published, and distributed among those persons directly interested, when a complaint of a nuisance is made to this Department.

A pamphlet, giving the law and regulations of this Department respecting the preparation and shipment of dead bodies, is published, and distributed among the licensed embalmers, railroad officials, and other persons interested in the transportation of the dead.

ANNUAL REPORTS.

About 2,500 copies of the Annual Report are published each year and about 2,400 copies are distributed among the following:

Members and ex-members of the State Board of Health, local health officers, secretary of state, territorial and provincial boards of health, sanitary journal exchanges, library exchanges, city hospitals and sanatoriums, presidents and secretaries of county medical societies, the State library and the Secretary of State.

PUBLIC HEALTH BULLETINS.

During the fiscal year ending June 30, 1913, the principal subjects treated in the Quarterly Bulletin were as follows:

Third Quarter of 1912.—"Sewage Disposal for Single Homes," by Edward D. Rich, C. E.; "The Use of Chlorine for Disinfection of Drinking Water," by Dr. M. L. Holm; "Water Sterilization by the Hypochlorite Treatment," by Edward D. Rich, C. E.

Fourth Quarter of 1912.—"Rural School Sanitation," by L. L. Wright; "Educational Value of Physical Training in the Public Schools," by E. P. Cummings; "The Duty of the State in the Medical Inspection of Schools; Results Which the Public May Rightfully Expect," by F. B. Dresslar; "Health Problems in Education," by T. D. Wood; "The Old and the New," by B. S. Tefft; "Dental Inspection in Public Schools," by Anna Dieterle; "The Dual Side of Sanitary Education," by D. E. McClure.

First Quarter of 1913.—"Eugenics or Race Betterment," by Dr. Victor C. Vaughan.

Second Quarter of 1913.—"Sanitation in Its Relation to Public Schools," by L. L. Wright; "What Constitutes a Model Milk Ordinance?" by Dr. A. H. Rockwell; "An Enlarged Public Health Service," by Dr. R. L. Dixon; "Municipal Control of the Venereal Diseases," by Dr. A. F. Fischer; "The Public Health Nurse and Her Work," by Dr. G. L. Kiefer; "Altruism in Public Health Work," by Dr. W. H. Sawyer; "Early Diagnosis of Tuberculosis," by Dr. V. C. Vaughan, Jr.; "Bovine Tuberculosis in Its Relation to Public Health," by Dr. Ward Giltner.

INVESTIGATIONS MADE BY THE STATE MEDICAL INSPECTORS DURING THE FISCAL YEAR ENDING JUNE 30, 1913.

In addition to his attendance at the regular and special meetings of the State Board of Health and at the examination of embalmers, which were held outside the city of Lansing, the secretary of this Board, as a medical inspector, together with others acting in the same capacity, under Act 293, P. A. 1909, made visits to the undermentioned localities for the purposes named:

Mt. Pleasant, July 1, 1912.—Investigation of a typhoid fever outbreak, by Dr. A. R. Wheeler.

Orangeville, July 10, 1912.—Investigation of an outbreak of smallpox, by H. S. Bartholomew, M. D.

Pontiac, July 15-16, 1912.—Investigating a case of hydrophobia, by Dr. Jas. G. Cummings.

Decatur, July 16, 1912.—Investigation of an outbreak of smallpox, by Dr. A. H. Rockwell.

Williamston Township, Ingham County July 29, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Marquette, August 7, 1912.—Investigating the sanitary conditions of that city, by Dr. Flarkin.

Ludington, August 26, 1912.—Investigation of an outbreak of infantile paralysis, by Dr. C. C. Slemons.

Superior Township, Washtenaw County, August 27, 1912.—Investigation of an outbreak of smallpox, by Dr. R. L. Dixon.

Coopersville, August 27, 1912.—Investigation of an outbreak of smallpox, by Dr. Thomas M. Koon.

Unadilla Township, Livingston County, August 30, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Galien, September 21, 1912.—Investigation of an outbreak of diphtheria, by Dr. C. N. Sowers.

Algonac, September 26, 1912.—Investigation of an outbreak of smallpox, by Dr. W. H. Smith.

Algonac, October 9, 1912.—Investigation of an outbreak of smallpox, by Dr. R. L. Dixon.

Almont, October 28, 1912.—Investigation of an outbreak of diphtheria, by Dr. W. H. Smith.

Mason, November 4, 1912.—Investigation of an outbreak of smallpox, by Dr. R. L. Dixon.

Leslie, November 6, 1912.—Investigation of an outbreak of smallpox, by Dr. R. L. Dixon.

Mason, November 9, 1912.—Investigation of an outbreak of smallpox, by Dr. R. L. Dixon.

Armada, November 11, 1912.—Investigation of an outbreak of diphtheria, by Dr. W. H. Smith.

Hopkins Township, Allegan County, November 13, 1912.—Investigation of an outbreak of smallpox, by Dr. Thos. M. Koon.

Trenton, November 16, 1912.—Investigation of an outbreak of smallpox, by Dr. Guy L. Kiefer.

Clinton, November 17, 1912.—Investigation of an outbreak of scarlet fever, by Dr. J. F. Breakey.

Mason, November 18, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Reed City, November 23, 1912.—Investigation of an outbreak of smallpox, by Dr. G. W. Pettey.

Vicksburg, November 24, 1912.—Investigation of an outbreak of smallpox, by Dr. A. H. Rockwell.

DeWitt Township, Clinton County, November 25, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Spaulding Township, Saginaw County, November 27, 1912.—Investigation of an outbreak of diphtheria, by Dr. R. L. Dixon.

Spaulding Township, Saginaw County, December 4, 1912.—Investigation of an outbreak of diphtheria, by Dr. G. L. Alger.

Lansing, December 10, 1912.—Investigation of an alleged nuisance, by Dr. H. S. Bartholomew.

Dansville, December 11, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Holt, December 12, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Lansing Township, Ingham County, December 20, 1912.—Investigating the surroundings of a case of tuberculosis, by Dr. H. S. Bartholomew.

Eckford Township, Calhoun County, December 26, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Clarendon Township, Calhoun County, December 26, 1912.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Wolverine, December 27, 1912.—Investigation of an outbreak of scarlet fever, by Dr. Edw. Goodman.

Alma, December 27, 1912.—Investigation of an outbreak of ptomaine poisoning, by Dr. G. W. Pettey.

Aurelius Township, Ingham County, January 4, 1913.—Investigation of an outbreak of smallpox, by Dr. B. M. Davey.

Stockbridge, January 4, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Plymouth, January 10, 1913.—Investigation of an outbreak of measles, by Dr. G. L. Kiefer.

Eau Claire, January 14, 1913.—Investigation of an outbreak of diphtheria, by Dr. C. N. Sowers.

Charlton Township, Otsego County, January 27, 1913.—Investigation of an outbreak of smallpox, by Dr. Edw. Goodwin.

Bedford Township, Monroe County, February 4, 1913.—Investigation of an outbreak of smallpox, by Dr. J. F. Breakey.

Pellston, February 7, 1913.—Investigation of an outbreak of scarlet fever, by Dr. J. J. Zweluwenberg.

Lakeview, February 7, 1913.—Investigation of an outbreak of scarlet fever, by Dr. G. W. Pettey.

Bedford Township, Monroe County, February 12, 1913.—Investigation of an outbreak of smallpox, by Dr. O. E. Parmalee.

Rochester, February 13, 1913.—Investigation of an outbreak of smallpox, by Dr. D. G. Castell.

Alaiedon and White Oak Townships, Ingham County, February 14-15, 1913.—Investigation of a scarlet fever outbreak, by Dr. H. S. Bartholomew.

Kinderhook Township, Branch County, February 19, 1913.—Investigation of a scarlet fever outbreak, by Dr. H. S. Bartholomew.

Whiteford Township, Ottawa County, February 19, 1913.—Investigation of an outbreak of smallpox, by Dr. O. E. Parmalee.

Olivet, March 7, 1913.—Investigation of an outbreak of scarlet fever, by Dr. H. S. Bartholomew.

Walton Township, Eaton County, March 7, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Lakeview, March 19, 1913.—Investigation of an outbreak of scarlet fever, by Dr. G. W. Pettey.

Williamston Township, Ingham County, March 20, 1913.—Investigation of an outbreak of scarlet fever, by Dr. H. S. Bartholomew.

Aurelius Township, Ingham County, March 23, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Williamston Township, Ingham County, March 25, 1913.—Investigation of an outbreak of scarlet fever, by Dr. H. S. Bartholomew.

Sodus, March 26, 1913.—Investigation of an outbreak of smallpox, by Dr. C. N. Sowers.

Cambria Township, Hillsdale County, March 30, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

LeRoy Township, Calhoun County, April 2, 1913.—Investigation of an outbreak of scarlet fever, by Dr. A. H. Rockwell.

Richmond Township, Saginaw County, April 4, 1913.—Investigation of an outbreak of diphtheria, by Dr. W. H. Smith.

Lafayette Township, Gratiot County, April 5, 1913.—Investigation of an outbreak of smallpox, by Dr. G. W. Pettey.

Lafayette Township, Gratiot County, April 17, 1913.—Investigation of an outbreak of smallpox, by Dr. G. W. Pettey.

Byron, April 25, 1913.—Investigation of an outbreak of scarlet fever, by Dr. H. S. Bartholomew.

Fairfield Township, Lenawee County, May 5, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Olive Township, Clinton County, May 13, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Alpena, May 17, 1913.—Investigation of a typhoid fever outbreak, by Dr. G. L. Kiefer.

Bloomingdale, May 18, 1913.—Investigation of a smallpox outbreak, by Dr. C. N. Sowers.

Port Huron, May 30-June 3, 1913.—Investigation of an outbreak of typhoid fever, by Dr. J. J. Zweluwenberg.

Algonac, June 4, 1913.—Investigation of an outbreak of smallpox, by Dr. W. H. Smith.

Otisville, June 6, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

Clay Township, St. Clair County, June 8, 1913.—Investigation of an outbreak of diphtheria, by Dr. W. H. Smith.

Algonac, June 10, 1913.—Investigation of an outbreak of scarlet fever, by Dr. W. H. Smith.

Howell, June 11, 1913.—Investigation of an outbreak of typhoid fever, by Dr. H. S. Bartholomew.

Edwardsburg, June 13, 1913.—Investigation of an outbreak of smallpox, by Dr. C. N. Sowers.

Ludington, June 16, 1913.—Investigation of an outbreak of smallpox, by Dr. S. Szudrawski.

Adrian, June 28, 1913.—Investigation of an outbreak of smallpox, by Dr. Bion Whalen.

Williamston, June 30, 1913.—Investigation of an outbreak of smallpox, by Dr. H. S. Bartholomew.

INVESTIGATIONS MADE BY MEDICAL INSPECTORS RELATIVE TO ALLEGED INSANITARY CONDITIONS IN CERTAIN LOCALITIES OR INSTITUTIONS LOCATED THEREIN DURING THE FISCAL YEAR OF 1913.

Fremont, July 2, 1912.—Investigation of plant of Fremont Canning Co., by Edward D. Rich.

Ludington, July 4, 1912.—Investigation of hypochlorite plant, by Edward D. Rich.

Hamlin Lake, Mason County, July 5, 1912.—Resort inspection, by Edward D. Rich.

We-Que-Ton-Sing, July 8, 1912.—Resort inspection, by Edward D. Rich.

Battle Creek, July 11, 1912.—Inspection of pumping station at Goguac Lake, by Edward D. Rich.

Royal Oak, July 12, 1912.—Water supply inspection, by Edward D. Rich.

South Haven, July 12, 1912.—Conference in regard to hypochlorite treatment of water, by Edward D. Rich.

Frankfort, July 16, 1912.—Inspection of water supply, by Edward D. Rich.

Congregational Assembly near Frankfort, July 16, 1912.—Investigation of sewage disposal works, by Edward D. Rich.

Elberta, July 16, 1912.—Sanitary inspection of village, by Edward D. Rich.

Traverse City, July 17-18, 1912.—Investigation of water supply, by Edward D. Rich.

Northport, July 18, 1912.—Inspection of small brook, by Edward D. Rich.

Petoskey, July 19, 1912.—Inspection of water works pumping station, by Edward D. Rich.

Roaring Brook, July 20, 1912.—Resort inspection, by Edward D. Rich.

Bessemer, July 24, 1912.—Investigation of sewerage conditions, by Edward D. Rich.

Laurium, July 25, 1912.—Sanitary inspection, by Edward D. Rich.

Bay View Camp Grounds Association, July 29, 1912.—Sanitary inspection of resort, by Edward D. Rich.

Harbor Springs, July 29, 1912.—Sanitary inspection, by Edward D. Rich.

Charlevoix, July 30, 1912.—Investigation of water supply, by Edward D. Rich.

Alanson, July 31, 1912.—Investigation of water supply, by Edward D. Rich.

Douglas Lake, Aug. 1, 1912.—Inspection of the engineering camp of the University of Michigan, by Edward D. Rich.

Bellevue, Aug. 6, 1912.—Conference with regard to the sanitary conditions of the town, by Edward D. Rich.

Kalamazoo, Aug. 7, 1912.—Conference with W. A. Perkins in regard to the building of a septic tank for single cottages at Gull Lake, by Edward D. Rich.

Buchanan, Aug. 7, 1912.—Inspection of the disposal of sewage from the plant of the Celfor Tool Company, by Dr. R. L. Dixon.

Kalamazoo, Aug. 8, 1912.—Sanitary inspection of State Hospital, by Edward D. Rich.

Battle Creek, Aug. 9, 1912.—Sanitary conditions along the shores of Goguac Lake, by Edward D. Rich.

Elkton, Aug. 13, 1912.—Investigation of water supply, by Edward D. Rich.

Adrian, Aug. 14, 1912.—Sanitary inspection of the State Industrial School for Girls, by Edward D. Rich.

Grand Rapids, John Ball Park, Aug. 16, 1912.—Investigation of sewage nuisance, by Edward D. Rich.

Grand Rapids, John Ball Park, Aug. 16, 1912.—Investigation of sewage nuisance, by Dr. T. M. Koon.

Reeds Lake, Aug. 16, 1912.—Sanitary inspection, by Edward D. Rich.

Orchard Lake, Oakland County, Aug. 19, 1912.—Sanitary inspection, by Edward D. Rich.

Ludington, Aug. 21, 1912.—Inspection of State Military Camp, by Edward D. Rich.

Ludington, Aug. 22, 1912.—Inspection of improved hypochlorite plant, by Edward D. Rich.

Onekama, Aug. 23, 1912.—Inspection of drainage of certain localities, by Edward D. Rich.

Onekama Township, Manistee County, Aug. 23, 1912.—Resort inspection, by Edward D. Rich.

Manistee, Aug. 24, 1912.—Conference with Dr. Harlen McMullen in regard to sanitary conditions of the city, by Edward D. Rich.

Wolfe Lake, Aug. 24, 1912.—Resort inspection, by D. E. McClure.

Escanaba, Aug. 26, 1912.—Conference with regard to the construction of a trunk sewer, by Edward D. Rich.

Blackman Township, Sept. 4, 1912.—Inspection of the plant of the Boland Rendering and Fertilizing Company, by Edward D. Rich.

Paw Paw Lake, Sept. 6, 1912.—Sanitary inspection, by Edward D. Rich.

Watervliet, Sept. 6, 1912.—Sanitary inspection, by Edward D. Rich.

Deerfield, Sept. 10, 1912.—Inspection of Raisin River, by Edward D. Rich.

Adrian, Sept. 10, 1912.—Inspection of the various cottages at the Industrial School for Girls, by Dr. R. L. Dixon.

Ironwood, Sept. 17-18, 1912.—Investigation of present and proposed water supply, by Edward D. Rich.

Charlotte, Oct. 1, 1912.—Inspection of four slaughter houses, by Dr. A. H. Rockwell.

Milan, Oct. 2, 1912.—Investigation of alleged nuisance, by Edward D. Rich.

Zeeland, Oct. 4, 1912.—Inspection of water supply, by Edward D. Rich.

Whitehall, Oct. 4, 1912.—Inspection of school house, by Edward D. Rich.

Berrien Springs, Oct. 18, 1912.—Investigation of water supply, by Edward D. Rich.

Hastings, Oct. 19, 1912.—Inspection of school house, by Edward D. Rich.

Decatur, Oct. 30, 1912.—Investigation of alleged nuisance, by Dr. A. H. Rockwell.

Marine City, Nov. 2, 1912.—Investigation with regard to the disposal of pulp from the beet sugar factory, by Dr. W. H. Smith.

Lakeview, Dec. 3, 1912.—Investigation of stockyard nuisance, by Dr. G. W. Pettey.

Alma, Dec. 26, 1912.—Inspection of sugar factory, by Edward D. Rich.

St. Louis, Dec. 27, 1912.—Inspection of the plant of the St. Louis Sugar Co., by Edward D. Rich.

Shepherd, Dec. 27, 1912.—Inspection of sanitary conditions, by Edward D. Rich.

Port Huron, Jan. 17, 1913.—Conference with regard to proposed sewer, by Edward D. Rich.

Niles, Jan. 17, 1913.—Inspection of water supply, by Edward D. Rich.

Muskegon, Jan. 27, 1913.—Investigation of drainage nuisance, by Dr. Geo. S. Williams.

Imlay City, Feb. 6, 1913.—Conference with regard to contemplated sewer system, by Edward D. Rich.

Bad Axe, Feb. 7, 1913.—Inspection of village with regard to sewerage system, by Edward D. Rich.

Alpena, Feb. 15, 1913.—Sanitary inspection, by Edward D. Rich.

Clarksville, Mar. 17, 1913.—Investigation of drainage nuisance, by Dr. T. M. Koon.

Saginaw, April 10, 1913.—Consultation with R. W. Roberts in regard to Bad Axe sewer system, by Edward D. Rich.

Alpena, April 11-12, 1913.—Inspection of sanitary conditions in regard to typhoid fever epidemic, by Edward D. Rich.

Haslett, April 28, 1913.—Investigation of pond hole nuisance, by D. E. McClure.

Monroe, May 9, 1913.—Investigation of garbage system, by Edward D. Rich.

Stanton, May 12, 1913.—Inspection of dumping grounds, by Dr. G. W. Pettey.

Alpena, May 13, 1913.—Investigation with reference to contagious diseases, by Dr. Guy L. Kiefer.

Jackson, May 14, 1913.—Inspection in and about the prison barns and grounds, by Dr. R. L. Dixon.

Sheridan, May 17, 1913.—Scarlet fever investigation, by Dr. G. W. Pettey.

Hastings, May 19, 1913.—Investigation regarding a sewerage system for two stores on State street, by Edward D. Rich.

Lakeview, May 20, 1913.—Inspection of school buildings, by Edward D. Rich.

Richland Township, May 21, 1913.—Investigation of typhoid cases, by Dr. G. L. Alger.

Millington, May 21, 1913.—Conference with Mr. C. J. Hock regarding alleged nuisance along the low lands bordering Millington Creek, by Edward D. Rich.

Kingsley, May 21, 1913.—Investigation of troubles at water pumping station, by Edward D. Rich.

Capac, May 23, 1913.—Inspection of sewerage system, by Edward D. Rich.

Grand Rapids, May 24, 1913.—Investigation of a tannery with regard to the disposal of waste, by Edward D. Rich.

Traverse City, May 24, 1913.—Conference with regard to difficulty at pumping station, by Edward D. Rich.

Berrien Springs, May 28, 1913.—Inspection of slaughter houses, by Dr. C. N. Sowers.

Edwardsburg, June 2, 1913.—Investigation of typhoid epidemic, by Dr. C. N. Sowers.

Lansing, June 7, 1913.—Inspection of slaughter houses, by D. E. McClure.

Reese, June 7, 1913.—Inspection of sewer outlet, by Edward D. Rich.

Jasper, June 9, 1913.—Inspection of water supply, by Dr. J. F. Breakey,

Sanford, June 12, 1913.—Inspection of property to be deeded to the State for a tuberculosis hospital, by Edward D. Rich.

Zeeland, June 19, 1913.—Investigations of alleged insanitary condition of cheese factory, by Dr. T. M. Koon.

Maybee, June 20, 1913.—Inspection regarding the drainage of Stoney Creek, by Edward D. Rich.

Sheldon, June 20, 1913.—Inspection of school building, by Dr. T. M. Koon.

Zeeland, June 23, 1913.—Inspection for site for proposed disposal plant, by Edward D. Rich.

Zeeland, June 23, 1913.—Investigation of alleged insanitary condition of cheese factory, Edward D. Rich.

Lansing, June 25, 1913.—Inspection of Lansing Cold Storage building, by D. E. McClure.

Mill Creek, Kent County, June 30, 1913.—Inspection of school building, by Dr. T. M. Koon.

LABORATORY REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1913.

To the Secretary of the State Board of Health:

Dear Doctor:—I beg herewith to submit to you a report of the work done at the laboratory for the fiscal year ending June 30, 1913.

SUMMARY OF EXAMINATIONS FOR YEAR ENDING JUNE 30, 1913, COMPARED WITH SUMMARY OF EXAMINATIONS FOR YEAR ENDING JUNE 30, 1912.

	1913.	1912.
Total number of examinations	6,780	5,293
Chemical and bacteriological examinations of water for potability	1,103	644
Sputa and other discharges examined for tubercle bacilli	2,767	2,480
Throat swabs examined for diphtheria bacilli	963	873
Blood samples examined for Widal's reaction	848	632
Chemical and microscopical examinations of urine	150	145
Pathological examinations of feces	7	16
Pathological examinations of tumors	36	44
Miscellaneous blood examinations	46	43
Chemical and bacteriological examinations of milk	437	114
Examinations for venereal disease	160	53
Toxicological and Medico-legal examinations	26	71
Beverages examined	68	178
Other miscellaneous examinations	169	178

SUMMARY OF EXAMINATIONS ARRANGED BY MONTHS.

Month.	Waters.		Sputa. Tuberculosis.		Throat Swabs. Diphtheria.		Blood. Widal's Reaction.		Smears. Venereal.		Miscellaneous.	Total.
	Safe.	Unsafe.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.		
July, 1912	74	49	76	160	17	24	34	35	3	4	166	642
August, 1912	77	42	59	151	17	25	33	49	5	4	92	554
September, 1912	51	59	60	141	18	21	50	51	.....	5	90	546
October, 1912	66	42	61	162	45	41	70	75	3	3	75	643
November, 1912	28	41	44	164	48	70	25	50	11	10	56	547
December, 1912	63	13	59	151	40	62	19	30	7	8	51	503
January, 1913	49	22	58	191	24	45	13	26	13	12	74	527
February, 1913	48	14	37	177	26	81	12	35	5	9	73	517
March, 1913	44	24	46	187	34	76	12	45	7	7	43	525
April, 1913	84	21	38	196	27	54	14	46	3	10	58	551
May, 1913	33	39	71	217	31	59	8	47	10	10	69	594
June, 1913	68	52	50	211	20	58	11	58	5	6	92	631
Total	685	418	659	2,108	347	616	301	547	72	88	939	6780

SUMMARY OF WATER EXAMINATIONS FOR THE YEAR ENDING JUNE 30, 1913.

	Safe	Unsafe	Total examined.
Adrian	4	3	7
Ahmeek	0	1	1
Albion	1	0	1
Allen	2	3	5
Allegan	3	0	3
Alma	1	0	1
Alpena	35	13	48
Ann Arbor	0	1	1
Battle Creek	20	5	25
Bay City	32	8	40
Belding	1	0	1
Bellaire	1	0	1
Belleville	0	3	3
Bellevue	3	3	6
Benton Harbor	6	7	13
Berrien Springs	2	10	12
Bessemer	0	1	1
Birmingham	2	3	5
Blissfield	6	3	9
Bonifas	2	0	2
Bronson	0	2	2
Burlington	0	2	2
Burr Oak	1	0	1
Byron Center	1	0	1
Camden	0	1	1
Capac	0	2	2
Caseville	2	1	3
Casnovia	1	0	1
Centreville	1	0	1
Central Lake	1	0	1
Charlotte	2	1	3
Chelsea	1	0	1
Clayton	2	1	3
Colon	0	2	2
Crystal Falls	1	0	1
Decatur	1	0	1
Deerfield	0	1	1
Detroit	0	2	2
Dexter	1	0	1
Dimondale	1	0	1
Dollar Bay	1	0	1
Dundee	0	4	4
Edwardsburg	2	0	2
Elkton	27	42	69
Elmira	0	1	1
Elsie	0	1	1
Emmett	2	3	5
Emmett Co.	1	0	1
Fenton	1	0	1
Fife Lake	1	0	1
Flint	7	0	7
Flushing	0	5	5
Ford	2	4	6
Frankfort	2	1	3
Freeland	0	1	1
Fulton	0	1	1

	Safe	Unsafe	Total examined.
Ganges	1	0	1
Gladstone	10	7	17
Grand Ledge	9	4	13
Grand Rapids	1	0	1
Grass Lake	0	2	2
Gwinn	1	0	1
Hamilton	1	1	2
Hancock	1	0	1
Harbor Springs	2	0	2
Harrisville	1	0	1
Hart	0	2	2
Hartford	0	1	1
Harvard	0	1	1
Haslett	3	2	5
Hastings	0	1	1
Hemlock	1	2	3
Hesperia	1	0	1
Hillsdale	1	1	2
Holland	10	4	14
Holt	1	0	1
Homer	1	0	1
Horton	0	2	2
Houghton	1	0	1
Howell	1	2	3
Hudson	0	2	2
Ida	0	1	1
Imlay City	2	0	2
Ionia	0	1	1
Iron Mountain	3	0	3
Ironwood	4	6	10
Ithaca	3	1	4
Jackson	3	0	3
Jennings	1	0	1
Kalamazoo	20	4	24
Kalkaska	1	1	2
Lake Linden	1	1	2
Lakeside	0	1	1
Lansing	44	13	57
Lansing R. F. D.	3	2	5
Lawrence	1	0	1
Lawton	1	0	1
Lennon	0	1	1
Leonidas	1	1	2
LeRoy	2	0	2
Lowell	1	0	1
Ludington	18	4	22
Manistee	1	0	1
Manistique	3	1	4
Maple Rapids	0	2	2
Marcellus	1	2	3
Marine City	4	0	4
Marquette	23	0	23
Mason	5	3	8
Meauwataka	1	0	1
Menominee	6	6	12
Merrill	0	1	1
Michigamme	0	1	1
Middleville	1	1	2
Midland	1	5	6

	Safe	Unsafe	Total examined.
Monroe	0	3	3
Montrose	1	0	1
Mount Clemens	4	1	5
Mount Pleasant	1	2	3
Munising	9	10	19
Muskegon	5	4	9
Nashville	6	3	9
Negaunee	13	2	15
New Haven	2	0	2
New Hudson	0	2	2
Niles	1	1	2
Northport	1	3	4
Norvell	0	1	1
Oak Grove	0	1	1
Okemos	1	2	3
Old Mission	0	2	2
Onekama	0	1	1
Onondaga	0	1	1
Onsted	0	1	1
Ontonagon	4	1	5
Osseo	1	0	1
Owosso	1	0	1
Paw Paw	5	2	7
Petoskey	4	1	5
Pigeon	1	0	1
Plainwell	1	0	1
Plymouth	1	0	1
Pontiac	2	0	2
Port Huron	112	68	180
Powers	1	0	1
Railroad Samples	2	5	7
Reese	0	1	1
Remus	0	1	1
Republic	1	0	1
Rives Junction	1	0	1
Rochester	0	1	1
Rogersville	1	0	1
Royal Oak	1	1	2
Saginaw	6	3	9
St. Clair	1	3	4
St. Helen	3	2	5
St. Johns	4	0	4
St. Joseph	14	3	17
St. Louis	1	5	6
Saline	0	2	2
Sebewaing	1	0	1
Shaftsburg	0	3	3
Six Lakes	0	1	1
Smiths Creek	1	0	1
South Haven	37	4	41
Sparta	2	5	7
Springport	1	2	3
Stambaugh	1	1	2
Suttons Bay	0	1	1
Tawas City	1	1	2
Three Oaks	0	2	2
Traverse City	3	0	3
Twining	2	0	2

	Safe	Unsafe	Total examined.
Unknown	15	3	18
Union	2	0	2
Union City	1	0	1
Unionville	0	1	1
Vassar	1	0	1
Washington	0	1	1
Wayland	1	0	1
Weston	2	7	9
Whitehall	1	0	1
Whittemore	1	0	1
Williamston	1	0	1
Woodland	5	3	8
Wyandotte	0	1	1
Zeeland	3	5	8
Zilwaukee	1	0	1

SUMMARY OF SPUTA EXAMINATIONS.

Total number of sputa examined for tubercle bacilli..... 2,767

Total number positive 659
Total number negative 2,108

Other organisms associated with tubercle bacilli in sputa:

Streptococci, 45
Staphylococci, 27
Pneumococci, 10
B. Influenza, 3
Micrococcus Catarrhalis, 3
Other organisms absent or not identified, 571

Other organisms predominating where tubercle bacilli were absent:

Streptococci, 170
Staphylococci, 203
Pneumococci, 168
B. Influenza, 54
Micrococcus Catarrhalis, 3
Other organisms absent or not identified, 1,510

SUMMARY OF THROAT SWABS EXAMINED.

Total number of throat swabs examined 963
Total number showing B. Diphtheria..... 347
Total number showing absence of B. Diphtheria..... 616
Total number of throat swabs examined for release from quarantine 283
Total number showing B. Diphtheria present..... 123
Total number showing B. Diphtheria absent..... 160

Total number of throat swabs examined for diagnosis		680
Total number showing B. Diphtheria present	224	
Total number showing B. Diphtheria absent	456	
Total number of throat swabs examined from cases where previous diagnosis of diphtheria had been made from clinical findings		132
Total number showing B. Diphtheria present	77	
Total number showing B. Diphtheria absent	55	
Per cent of cases of clinical diphtheria not caused by B. Diphtheria		42
Total number of throat swabs examined where clinical diagnosis was regarded as questionable		371
Total number showing B. Diphtheria present	105	
Total number showing B. Diphtheria absent	266	
Per cent of questionable cases found to be diphtheria		28
Total number of throat swabs examined from cases where previous diagnosis other than diphtheria has been made		177
Total number showing B. Diphtheria present	42	
Total number showing B. Diphtheria absent	135	
Per cent found to be diphtheria		24

Other organisms identified when associated with B. Diphtheria in swabs examined for diagnosis:

Staphylococci, 15
Bacillus Fusiformis, 9
Pneumococci, 18
Bacillus Influenza, 1
Streptococci, 3
Mixed Bacteria, 1

Other organisms found to predominate in cases that were considered diphtheria clinically but not diphtheria bacteriologically:

	Swab	Culture
Streptococci	1	3
Staphylococci	5	29
Bacillus Influenza	1	0
Pneumococci	13	10
Micrococcus Catarrhalis	1	0
Bacillus Fusiformis	5	0
Saccharomyces	0	3

Bacillus Fusiformis was found to predominate in direct smear from swabs 65 times. The cultures from these smears showed the following:

Streptococci, 10
Staphylococci, 31
Bacillus Diphtheria, 9
Saccharomyces, 1
Micrococcus Catarrhalis, 1
Pneumococci, 7
Bacillus Mucosus Capsulatus, 1
Unidentified, 5

Organisms found to predominate in negative cases of suspected diphtheria:

	Swab	Culture
Streptococci	19	67
Staphylococci	80	232
Pneumococci	99	83
Micrococcus Catarrhalis	7	2
Bacillus Influenza	5	1
Bacillus Fusiformis	54	0
Bacillus Coli	0	2
Saccharomyces	0	10
Leptothrix	3	0
Moulds	1	2
Bacillus Mucosus Capsulatus	0	4
No organisms present or not identified	144	9

Respectfully submitted,

M. L. HOLM.

PUBLIC HEALTH LEGISLATION IN MICHIGAN IN 1913.

During the legislative session of 1913, the following public health acts were passed and approved:

Act 34, P. A. 1913.

An Act to authorize the sterilization of mentally defective persons maintained wholly or in part by public expense in public institutions in this state, and to provide a penalty for the unauthorized use of the operations provided for.

The People of the State of Michigan enact:

SECTION 1. Authority is given to the management of any institution maintained wholly or in part by public expense, in whose custody may be held individuals who have been by a court of competent jurisdiction adjudged to be and who are mentally defective or insane, to render incapable of procreation, by vasectomy or salpingectomy or by the improvement of said surgical operation which is least dangerous to life and will best accomplish the purpose, any person who is mentally defective or insane.

SEC. 2. The boards of the aforesaid institutions and the physicians or surgeons in charge of each of said institutions, shall for each of their respective institutions constitute a board, the duty of which shall be to examine such inmates of said institutions as are reported to them by the warden or medical superintendent to be persons by whom procreation would be inadvisable. Such board shall receive the report of insanity experts hereinafter mentioned, examine the physical and mental condition of such persons and their record and family history so far as the same can be ascertained, and if in the judgment of a majority of said board, procreation by any such person would produce children with an inherited tendency to insanity, feeble-mindedness, idiocy or imbecility, and there is no probability that the condition of such person so examined will improve to such an extent as to render procreation by any such person advisable, or if the physical or mental condition of any such person will be substantially improved thereby, then said board shall direct a competent physician or surgeon with such other assistants as may be necessary, to perform the operation of vasectomy or salpingectomy or any other operation or improvement on vasectomy or salpingectomy recognized by the medical profession, as the case may be, upon such person. Such operation shall be performed in a safe and humane manner, and the board making such examination, and the institution physician or surgeon shall receive no extra compensation

therefor: Provided, That at least thirty days' notice shall be given to the parents or guardian of such person before the performing of such operation; said notice to specify the purpose, time and place of such examination: Provided further, That when said parents or guardian object to the performance of such operation, then the question of the sanity of such person shall be referred to the probate court of the county in which the institution is located where the question of the sanity and the necessity for this operation shall be determined as in other insane cases before such courts.

SEC. 3. In case an institution has no physician at its head authority is given to the board of managers to cause such operation to be performed, to hire expert physicians to examine and report on the condition of the subject, and to perform the operation with such other assistants as may be necessary: Provided, Before said operation is ordered there shall first be secured from two physicians having qualifications prescribed by law for examiners in insanity, a written statement or report that such operation is desirable in the interests of the patient or the good of the community: And provided further, That these physicians shall be allowed for their services the compensation fixed by statutes for the examination and certification of an insane person. The several sums necessary to carry out the provisions of this act shall be certified to be correct by the respective boards and shall be paid out of the general fund of the state upon the warrant of the auditor general.

SEC. 4. In relation to each individual person sterilized under the provisions of this act, the board of control of the institution in which said person is an inmate shall file with the state board of public health of Michigan, a written record setting forth the name, age, sex, nationality, type or class of mental defectiveness of said person, the nature of the operation performed, the subsequent mental and physical condition as affected by said operation: Provided, That said records shall not be for public inspection, but may be open to inspection of the members of the board of control of the aforesaid institutions and of the members of the immediate family of the person operated upon, or any physician or surgeon designated by them.

SEC. 5. Except as authorized by this act, every person who shall perform, encourage, assist in or otherwise promote the performance of either of the operations described in section one of this act, for the purpose of destroying the power to procreate the human species, or any persons who shall knowingly permit either of such operations to be performed upon such person, unless the same shall be a medical necessity, shall be guilty of a felony, and upon conviction thereof shall be fined not more than one thousand dollars or imprisoned in the state prison not more than five years, or both in the discretion of the court before whom the said person or persons were so convicted.

Approved April 1, 1913.

Act No. 87 P. A. 1913.

An Act to amend section eight of act number three hundred nineteen of the Public Acts of nineteen hundred nine, entitled "An act to provide for the examination, regulation, licensing and registration of nurses, and for the punishment of offenders against this act."

The People of the State of Michigan enact:

SECTION 1. Section eight of act number three hundred nineteen of the Public Acts of nineteen hundred nine, entitled "An act to provide for the examination, regulation, licensing and registration of nurses, and for the punishment of offenders against this act," is hereby amended to read as follows:

SEC. 8. Any person properly registered under the provisions of this act shall, before entering any service in that capacity, furnish a certificate of good health from a properly registered physician, showing that he or she is free from tuberculosis or any specific or infectious disease; said certificate to be renewed semiannually. The Michigan State Board of Registration of Nurses is hereby authorized to employ or appoint a registered nurse who has had not less than five years' experience in nursing since graduation, three years of which have been spent as superintendent of a training school approved by said board, who may also be one

of the members of said board, to act as a visitor and inspector of training schools for nurses, to the end that the rules and regulations adopted by said board may be promoted and upheld throughout the State. Such visitor and inspector shall act under the direction of the Michigan State Board of Registration of Nurses. The compensation of such visitor and inspector shall be determined by said board and shall be paid only from funds collected in the registration of nurses and in a similar way in which the incidental and traveling expenses of the members of the board are now paid, as provided for in section six of said act.

Approved April 21, 1913.

Act 93, P. A. 1913.

An Act for the supplying of individual drinking utensils in certain cases by persons, firms and corporations, maintaining drinking fountain, water cooler, tank or other device for public drinking purposes; the posting of placards in certain cases and providing a penalty for a violation of the provisions of this act.

The People of the State of Michigan enact:

SECTION 1. Hereafter it shall be the duty of every person, firm or corporation, within this state, maintaining any public drinking fountain, water cooler or tank, or any other device dispensing water for public drinking purposes, other than a sanitary fountain, to provide for supplying individual drinking utensils by sale or free distribution; and if by sale, at a cost not exceeding one cent for each individual utensil. In case there shall be no facilities for furnishing as aforesaid individual utensils at any such fountain, water cooler, tank or other device, the person, firm or corporation so maintaining the same shall post in close proximity thereto a placard designating the place at which or the person from whom such individual drinking utensils may be procured.

SEC. 2. Any person, firm or corporation violating the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction be punished by a fine of not less than ten dollars nor more than twenty-five dollars, or by imprisonment in the county jail not to exceed thirty days, or by both such fine and imprisonment, in the discretion of the court.

Approved April 21, 1913.

Act No. 98, Public Acts 1913.

An Act providing for the supervision and control by the State board of health over waterworks systems and sewage disposal systems, and providing for the appointment, duties, salary and expenses of a State sanitary engineer, and providing penalties and defining liabilities for violations of this act; and to repeal act number twenty-eight of the Public Acts of nineteen hundred nine.

The People of the State of Michigan enact:

SECTION 1. The State board of health is hereby given supervisory and visitorial power and control as limited in this act over all corporations both municipal and private, partnerships and individuals engaged in furnishing water to the public for household or drinking purposes, and over the plants and systems owned or operated by such municipal or private corporations, partnerships or individuals. The word "corporation" as hereinafter used in this act shall be taken to mean and include municipal corporations as well as private corporations.

SEC. 2. The State board of health, its agents and representatives, shall have the power and authority to enter upon, at all reasonable times, the pumping plants, filtering plants, reservoirs, standpipes, cribs and other property of such corporations, partnerships, or individuals, for the purpose of inspecting the same and carrying out the authority vested in them by this act.

SEC. 3. The State board of health shall have authority to make and enforce such rules and regulations as it may deem necessary, governing and providing a method of conducting and operating the entire or any part of the systems of waterworks, including the filtration plants, owned or operated by such corpora-

tions, partnerships or individuals, and may make and enforce penalties for the non-compliance with such rules and regulations; and said board shall, in addition to the other powers herein vested in it, whenever it shall deem it necessary for the protection of health, have authority to direct such corporations, partnerships or individuals operating waterworks systems to cleanse any portion of such systems as it may deem necessary, and to operate the same in such manner as to furnish pure and wholesome water, and to enforce such directions by rule or regulations.

SEC. 4. Whenever the mayor of a city, president of a village, supervisor of a township, health officer or representative of the State board of health has reason to believe that the water furnished by any corporation, partnership or individual is contaminated, then it shall be the duty of the State board of health, upon the request of such officer, to investigate the same and to determine by laboratory analysis the condition of said water, and the certificate of the State bacteriologist showing result of such analysis shall be prima facie evidence of the matters stated in such certificate and also as to the source of the water and the time and place of taking, and of all matters that may be stated in said certificate.

SEC. 5. The expenses of the investigation and analysis made by the State board of health shall be borne by the locality, and shall be paid for at the rate of five dollars per day and necessary traveling expenses while making such investigation and analysis, and shall constitute a charge against the city, village or township asking for such investigation; the said per diem to be covered into the State treasury to the credit of the State board of health laboratory fund in addition to the amount already appropriated.

SEC. 6. It shall be the duty of the mayor of each city, the president of each village and of all private corporations, partnerships or individuals now or hereafter operating waterworks systems in this State, to file with the State board of health a true and correct copy of the plans and specifications of the entire system owned or operated by such corporation, partnership or individual, including such filtration or other purification plant as may be operated by them in connection therewith, and also plans and specifications of all alterations, additions, or improvements to such systems which may be made from time to time. The plans and specifications herein referred to shall, in addition to all other things, show all the sources through or from which water is or may be at any time pumped or otherwise permitted or caused to enter into such system. Such plans and specifications shall be certified by the mayor and city engineer of city corporations, by the president and engineer, if one is employed, for village corporations, and by such proper officer and the engineer employed by a private corporation for private corporations, and by some individual member of a partnership, or by the individual owner in case of waterworks owned and operated by partnerships or individuals, including the engineer employed, if any. If within sixty days after this act shall take effect or within sixty days after any corporation, partnership or individual shall commence to operate, or within sixty days after any alterations, additions or improvements shall be made by such corporation, partnership or individual, any municipal officer or other person whose duty it is to file the same under the provisions of this act, shall wilfully fail to file a copy of the plans and specifications as provided herein, or shall knowingly file false or incomplete copies of such plans and specifications, such officer or person shall be deemed guilty of a misdemeanor, and shall be subject to a fine of not less than twenty-five dollars and not more than one hundred dollars or to imprisonment in the county jail not more than thirty days, or to both such fine and imprisonment, and in addition thereto shall be subject to a penalty of twenty-five dollars for each and every day such person or officers shall fail or neglect to file such plans and specifications, which penalty may be collected in any court of competent jurisdiction on the complaint of any member of the State board of health, and it shall be the duty of the attorney general to prosecute such complaint, and any penalties recovered shall be deposited in the general fund of the State.

SEC. 7. The words "plans and specifications" as used in this act shall be construed to mean a true description or representation of the entire systems operated by such corporation, partnership or individual as the same shall be actually in use at the time of filing the same, and also a full and fair statement of how the same is operated: Provided, That any corporation, partnership or individual that has already filed with the State board of health such plans and specifications as are required by section six of this act, shall not be required to file such plans and specifications.

SEC. 8. In case of corporations, partnerships or individuals operating filtration plants in which there are beds or other appliances to be cleansed, it shall be the duty of such corporations, partnerships or individuals to file with the State board of health an annual report under oath on or before the first day of January in each year, showing the dates on which and the number of times such beds or appliances were cleansed during the preceding year. Such report shall be sworn to by any municipal officer or person acquainted with the facts and employed by such corporation, partnership, or individual at the time of making said report. In the case of a municipal corporation, it shall be the duty of the clerk thereof to prepare and forward such report. Any person making a false statement in such annual report shall be deemed guilty of and subject to the penalty of perjury.

SEC. 9. Any corporation other than municipal, any partnership, company or individual, or any officer of any municipal corporation having the duty imposed upon him by this act, who shall violate any provisions of this act where no other penalty is provided therein, shall be guilty of a misdemeanor, and shall be punished therefor as provided by law.

SEC. 10. It shall be the duty of the State board of health on receipt of the plans and specifications of such waterworks systems to inspect the same with reference to their effect upon the public health, and if such board on such inspection finds that the public water supply of any such city or village is impure and dangerous to individuals or to the public generally, the said board on its order may require the corporation, partnership or individual owning and operating the same to make such alterations in such waterworks systems as may be required or advisable in the opinion of said board, in order that the water supply may be healthful and free of pollution. Such recommendations or orders of the State board of health shall be served in writing upon such corporations, partnerships or individuals, and it shall thereupon be the duty of such corporations, partnerships or individuals to comply with such recommendations or orders.

SEC. 11. The State board of health shall have the same power of visitation, inspection, direction and control over the sewage disposal systems of the cities and villages of this State as is herein given with respect to waterworks systems. The mayor of each city and the president of each village shall file with the secretary of the State board of health, on or before the first day of January, nineteen hundred fourteen, a true and correct description of the entire sewage system owned by the municipality. It shall be the duty of the State board of health on receipt of such plans and specifications to inspect the same with reference to their effect upon the public health, and if such board on such inspection finds that such sewage systems or any parts thereof are dangerous to individuals or to the public health generally, the said board on its order may require such alterations in such systems as may be required or advisable in the opinion of such board: Provided, That nothing herein contained shall be construed to grant any power to prevent any municipality now disposing of its sewage into any river, from continuing so to do. Such recommendations or orders shall be served in writing upon the clerk of the city or village, and thereupon it shall be the duty of such city or village to make such alterations, changes or additions to its sewage system as shall have been so recommended or ordered by said board. Such orders may be reviewed or enforced by any court of chancery or other court having jurisdiction.

SEC. 12. The State board of health is hereby authorized and empowered to employ a sanitary engineer, who shall be known by the title of State Sanitary Engineer, who shall give his full time under the direction of the State board of health to the visitation, inspection and investigation of the waterworks systems, sewage disposal systems, garbage disposal systems in the cities and villages of this State, and to such other matters as the State board of health may direct. He shall be paid a salary of a sum not to exceed three thousand dollars per annum, and his expenses for traveling and clerk hire under the direction of the State board of health, to be paid out of the general fund of the State, the same to be audited as provided by law on the approval of the secretary of the State board of health. He shall at all times be subject to the orders of and removal by the State board of health.

SEC. 13. Act number twenty-eight of the Public Acts of nineteen hundred nine is hereby repealed.

Approved April 22, 1913.

Act 123 Public Acts 1913.

An Act to provide for the prevention of blindness in the newly born by fixing the duty of the State Board of Health in regard thereto, and compelling doctors, nurses and midwives to treat the eyes of infants in a certain manner and to provide a penalty for failure so to do, and to repeal act number forty-three of the Public Acts of eighteen hundred ninety-five.

The People of the State of Michigan enact:

SECTION 1. It shall be the duty of the State Board of Health to officially name and approve a prophylaxis, to be used in treating the eyes of newly born infants, and it shall be the duty of the board to publish instructions for using the same.

SEC. 2. It shall be the duty of any physician, nurse or midwife who shall assist and be in charge at the birth of any infant, or have care of the same after birth, to treat the eyes of the infant with a prophylaxis approved by the State Board of Health and such treatment shall be given as soon as practicable after the birth of the infant and always within one hour; and if any redness, swelling, inflammation or gathering of pus shall appear in the eyes of such infant or upon the lids or about the eyes within two weeks after birth, then any nurse, midwife or other person having care of the infant shall report the same to some competent practicing physician within six hours of its discovery.

SEC. 3. Any failure to comply with the provisions of section two of this act shall be punishable by a fine not to exceed one hundred dollars or imprisonment in the county jail not to exceed six months, or both such fine and imprisonment in the discretion of the court.

SEC. 4. Act number forty-three of the public acts of eighteen hundred ninety-five, approved March twenty-nine, eighteen hundred ninety-five, the same being compiler's sections number four thousand four hundred seventy-five and four thousand four hundred seventy-six of the compiled laws of eighteen hundred ninety-seven, is hereby repealed.

Approved April 29, 1913.

Act No. 150, P. A. 1913.

An Act to create a commission to investigate the extent of feeble-mindedness, epilepsy, insanity and other conditions of mental defectiveness, and to appropriate the necessary moneys for the expense to be incurred by said commission in the performance of its duties.

The People of the State of Michigan enact:

SECTION 1. There shall be a commission created to investigate the extent of feeble-mindedness, epilepsy, insanity and other conditions of mental defectiveness prevalent in the State of Michigan, and to make a study of the causes productive of these conditions.

SEC. 2. This commission shall be composed of the following members: The medical director of the State psychopathic hospital at the University of Michigan, the Superintendent of Public Instruction, the secretary of the State Board of Health, and the secretary of the State Board of Corrections and Charities. The medical director of the State Psychopathic Hospital is herewith made the executive officer of the commission.

SEC. 3. It shall be the duty of any and all officials in charge of any public, private, religious, charitable, penal or correctionary institution in whose custody are held individuals whose mental condition comes within the scope of investigation of this commission to furnish such information as may be desired by the commission, and to keep, during the existence of this commission such records as it may prescribe.

SEC. 4. This commission shall present to the Legislature of nineteen hundred fifteen a printed report embodying the results of its work, together with such recommendations for the treatment and prevention of these conditions as are suggested by their investigation.

SEC. 5. The commission is authorized to appoint such officials and employes as it may regard as necessary to carry on the purposes of this act, and such persons shall be paid such salaries as may be recommended by the commission and approved by the Board of State Auditors. These salaries and all expenses of the commission, after being duly certified by the chairman or some authorized member of the commission, shall be paid from the general fund of the State. The members of this commission shall receive no compensation for their services, but their actual and reasonable expenses incurred in the performance of their duties shall, after approval by the commission, be paid by the State Treasurer on the warrant of the Auditor General, on the rendering of their accounts, out of any moneys to the credit of the general fund not otherwise appropriated. The above payments to be made in accordance with the general accounting laws of the State.

This act is ordered to take immediate effect.

Approved May 2, 1913.

Act 151, P. A. 1913.

An Act providing for the protection of the public health and the prevention of fraud and deception, by prohibiting the sale, the offering for sale or exposing for sale or the having in possession with intent to sell, of adulterated or deleterious sausage; defining sausage; and prescribing the penalty for the violation hereof.

The People of the State of Michigan enact:

SECTION 1. It shall be unlawful for any person or persons, by himself, herself or themselves, or by his, her or their agents, servants or employes, to sell, offer for sale, expose for sale, or have in possession with intent to sell, sausage that is adulterated within the meaning of this act. Sausage when used in this act shall be deemed to include Bologna, Wienewurst and Frankforts.

SEC. 2. For the purpose of this act, sausage or sausage meat shall be held to be a comminuted meat from neat cattle or swine, or a mixture of such meats, either fresh, salted, pickled or smoked, with added salt and spices, and with or without the addition of edible animal fat, blood and sugar, or subsequent smoking. It shall contain no larger amount of water than the meats from which it is prepared contain when in their fresh condition.

SEC. 3. For the purpose of this act, sausage shall be deemed to be adulterated:

First, If it contains added water in excess of the quantity required to bring the amount up to that which the meats from which it is prepared contain immediately after slaughter;

Second, If it contains any cereal or vegetable flour;

Third, If it contains any coal-tar dye, boric acid or borates, sulphites, sulphur dioxide, sulphurous acid, or any other substances injurious or deleterious to health;

Fourth, If it contains any diseased, contaminated, filthy or decomposed substance; or is manufactured, in whole or in part, from a diseased, contaminated, filthy or decomposed substance, or a substance produced, stored, transported or kept in a way or manner that would render the article diseased, contaminated or unwholesome; or if it is any product of a diseased animal, or the product of any animal which has died otherwise than by slaughter. Nothing in this act shall be construed as prohibiting the sale of sausage which when properly labeled shall conform to the following standard: Sausage shall not contain cereal in excess of two per cent. When cereal is added its presence shall be noted on the label or on the product. That water or ice shall not be added to it except for the purpose of facilitating grinding, chopping and mixing, in which case the added water or ice shall not exceed three per cent except as provided in the following paragraph. Sausages of the class which are cooked or smoked, such as Frankfort style, Vienna style and Bologna style, may contain added water in excess of three per cent, but not in excess of amount sufficient to make the sausage palatable. When water in excess of three per cent is added to this class of sausage, the statement "Sausage, water and cereal" shall appear on the label or on the product, but when no cereal is added, the addition of water need not be stated.

SEC. 4. Any person who shall violate any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be sentenced to pay a fine of not less than one hundred dollars, nor more than two hundred dollars, or to

undergo an imprisonment of not less than thirty days, nor more than sixty days, or both or either, in the discretion of the court.

SEC. 5. The dairy and food commissioner shall be charged with the enforcement of the provisions of this act.

Approved May 2, 1913.

Act No. 154, P. A. 1913.

An Act to amend section ten of chapter thirty-five of the Revised Statutes of eighteen hundred forty-six, entitled "Of the preservation of the public health; quarantine, nuisances, and offensive trades," being compiler's section four thousand four hundred nineteen of the Compiled Laws of eighteen hundred ninety-seven.

The People of the State of Michigan enact:

SECTION 1. Section ten of chapter thirty-five of the Revised Statutes of eighteen hundred forty-six, entitled "Of the preservation of the public health; quarantine, nuisance, and offensive trades," being compiler's section four thousand four hundred nineteen of the Compiled Laws of eighteen hundred ninety-seven, is hereby amended to read as follows:

SEC. 10. If the owner or occupant shall not comply with such order of the board of health, such board may cause the said nuisance, source of filth or cause of sickness to be removed and all expenses incurred thereby shall be paid by the said owner of such premises. If the owner of said premises shall refuse on demand of said board of health to pay such expenses so incurred, any sums so paid shall be assessed against such property and shall be collected and treated in the same manner as are taxes assessed under the general laws of the State. If the occupant or any other person shall have caused or permitted said nuisance to exist he shall be liable to the owner of said premises, for any amount so paid by such owner or assessed against said property which amount shall be recoverable in an action at law.

Approved May 2, 1913.

Act 179, P. A. 1913.

An Act to regulate, prevent and punish the feeding of the flesh of old, decrepit, infirm, sick or diseased animals and unwholesome offal to animals or fowls, and provided a penalty for the violation thereof.

The People of the State of Michigan enact:

SECTION 1. No person shall feed to animals or fowls the flesh of an animal which has become old, decrepit, infirm or sick, or which has died from such cause, or offal or flesh that is putrid or unwholesome.

SEC. 2. Whoever shall do any of the acts or things prohibited by this act, or in any way violates any of its provisions, shall be deemed guilty of a misdemeanor, and shall be punished by a fine of not more than one hundred dollars and the costs of prosecution, or by imprisonment in the county jail not more than ninety days, or by both such fine and imprisonment in the discretion of the court.

SEC. 3. This act is immediately necessary for the preservation of the public health.

Approved May 2, 1913.

Act No. 188, P. A. 1913.

An Act relating to the conduct of hotels, inns and public lodging houses.

The People of the State of Michigan enact:

SEC. 1. Every building or structure kept, used or maintained as, or held out to the public to be an inn, hotel or public lodging house, shall, for the purpose of this act, be defined as a hotel, and wherever the word "hotel" shall occur

in this act it shall be construed to mean every such structure as is described in this section.

SEC. 2. Every hotel that is more than two stories high shall be equipped with an iron fire escape on the outside of the building connecting on each floor, above the first, with at least two openings, which shall be well fastened and secured with landings not less than six feet in length and three feet in width, guarded by an iron railing not less than three feet in height. Such landings shall be connected by iron stairs not less than two feet wide and with steps of not less than six inch tread and not more than eight inch rise, placed at an angle of not more than forty-five degrees and protected by a well secured hand rail on both sides and reaching to within twelve feet of the ground, with a drop ladder eighteen inches wide reaching from the lower platform to the ground. Such fire escapes shall be sufficient if a perpendicular ladder shall be used instead of the stairs, provided such iron ladder is placed at the extreme outside of the platform and at least three feet away from the wall of the building, and provided said ladder is equipped with round iron rounds not more than fifteen inches apart, except that fire-proof buildings may have inside fire escapes placed in a well, shaft, or opening which shall be built of fire-proof material and shut off from the remainder of the building by fire-proof, tight doors. The way of egress to such fire escape shall at all times be kept free and clear of all obstruction of any and every nature. Storm windows and storm doors shall be considered an obstruction for the purpose of this act, and such way of egress shall at all times be kept unlocked. There shall be posted and maintained in a conspicuous place in each hall and each guest room, except the halls and rooms on the ground floor, of such hotel, a printed notice in characters not less than two inches high calling attention to and directing the way to such fire escape.

SEC. 3. Each and every hotel shall be provided with at least one sufficient chemical fire extinguisher for every twenty-five hundred square feet or less of floor area, which such extinguisher or extinguishers shall be placed in a convenient location in a public hallway outside of the sleeping rooms, and shall always be in condition for use.

SEC. 4. Every hotel that is not over two stories in height and which is not provided with such fire escape as is described in section two hereof, shall provide in every bedroom or sleeping apartment on the second floor a manila rope at least five eighths of an inch in diameter and knotted every eighteen inches, and of sufficient strength to sustain a weight and strain of at least five hundred pounds, and of sufficient length to reach the ground. Such rope shall be securely fastened to the joists or studdings of the building as near the windows as practicable, and shall be kept coiled in plain sight at all times, nor shall such rope be covered by curtains or other obstruction. Every such hotel shall provide and maintain in a conspicuous place in every bedroom or sleeping apartment above the ground floors, a printed notice calling attention to such rope and giving directions for its use.

SEC. 5. Every hotel shall be well drained and maintained according to established sanitary principles; shall be kept clean and in a sanitary condition and free from effluvia arising from any sewer, drain, privy or other source within the control of the owner, manager, agent or other person in charge; shall be provided with water closets or privies properly screened for the separate use of males and females, which water closets or privies shall be disinfected as often as may be necessary to keep them at all times in a sanitary condition.

SEC. 6. Every hotel shall have and provide all toilet rooms, bath rooms and sleeping rooms with individual textile towels. Every hotel shall have and provide all beds with regulation sheets, not less than ninety inches in length. Such beds shall also be provided with sufficient number of regulation size blankets or quilts that are kept in a sanitary condition.

SEC. 7. Every owner, manager, agent or person in charge of a hotel, who shall fail to comply with any of the provisions of this act, shall be deemed guilty of a misdemeanor, and shall be fined not less than twenty-five dollars nor more than fifty dollars, or shall be imprisoned in the county jail for not less than thirty days nor more than sixty days, or both, and every day that such a hotel is carried on in violation of this act shall constitute a separate offense.

SEC. 8. The Labor Commissioner, Dairy and Food Commissioner, Insurance Commissioner and the executive officer of the State Board of Health shall constitute a commission for the purpose of carrying into effect the provisions of this

act, and same shall be delegated with the power to adopt such rules and regulations as conditions may require.

SEC. 9. Such commission shall delegate and confer the title of hotel inspector or deputy inspectors upon such men now operating under the supervision of the several departments constituting this commission, and in such number as the lawful enforcement of this act shall justify.

SEC. 10. It shall be the duty of the inspector and his deputies to see that all of the provisions of this act are complied with, and said inspector or the deputy for the district shall personally inspect at least once each year and at such other times as in the best judgment of the commission or the deputy the occasion demands as defined by this act.

SEC. 11. Said inspector and his deputies are hereby granted police power to enter any hotel at reasonable hours to determine whether the provisions of this act are being complied with.

SEC. 12. If the inspector or deputy shall find after examination of any hotel that this law has been fully complied with, he shall issue a certificate to that effect to the person operating the same, and said certificate shall be kept posted up in a conspicuous place in said inspected building. Such certificate shall be prepared in blank by said commission.

SEC. 13. Any inspector who shall wilfully certify falsely regarding any building inspected by him, and who shall issue a certificate to any person operating in any hotel when such person has not complied with the provisions of this act, shall on conviction thereof be fined not less than fifty dollars nor to exceed one hundred dollars, and may be imprisoned not to exceed ninety days in the county jail, or both at the discretion of the court, and upon conviction shall be forever disqualified to hold said office.

SEC. 14. Any owner, manager, agent or person in charge of a hotel, who shall obstruct or hinder an inspector in the proper discharge of his duties under this act, shall be guilty of a misdemeanor, and upon conviction thereof, shall be fined not less than twenty-five dollars nor more than fifty dollars, or shall be imprisoned in the county jail not less than thirty days nor more than sixty days, or both.

SEC. 15. It shall be the duty of the inspector, upon ascertaining by inspection or otherwise, that after sixty days from the time this act takes effect, any hotel is being carried on contrary to its provisions, to make complaint and cause the arrest of the person so violating the same; and it shall be the duty of the prosecuting attorney in such cases to prepare all necessary papers and conduct such prosecutions.

Approved May 6, 1913.

Act No. 196, P. A. 1913.

An Act to amend sections two, four, ten and eleven of act number two hundred forty-eight of the Public Acts of nineteen hundred eleven, entitled "An act providing for the incorporation of medical milk commissions, and certification of milk produced under their supervision."

The People of the State of Michigan enact:

SECTION 1. Sections two, four, ten and eleven of act number two hundred forty-eight of the Public Acts of nineteen hundred eleven, entitled "An act providing for the incorporation of medical milk commissions, and certification of milk produced under their supervision," are hereby amended to read as follows:

SEC. 2. Such certificates shall set forth:

The name of such association, which shall be as hereinafter designated;

The purpose for which the association shall be formed;

The names and residences of the medical directors who shall manage the affairs of the association for the first year of its existence;

The city, village or township in this State where such association shall operate.

SEC. 4. The name of such association shall be "The Medical Milk Commission of the ..... [stating whether city, village or township] ..... of ..... [designating the name of city, village or township] ....[designating the name of county] ..... County of Michigan."

SEC. 10. No person, firm or corporation shall sell or exchange or offer or expose for sale or exchange in any city, village or township as and for certified milk, any milk which is not certified by the medical milk commission of that city, village or township, and which is not produced in conformity with the methods and regulations for the production of certified milk from time to time adopted by the American association of medical milk commissions, and which is below the standards of purity and quality for certified milk as fixed by the American association of medical milk commissions.

SEC. 11. Whoever shall by himself, servant or agent sell, exchange or deliver or have in his custody with intent to sell, exchange or deliver, or offer or expose for sale in any city, village or township as certified milk, any milk which has not been certified by the medical milk commission of that city, village or township, or shall violate any of the provisions of this act, shall upon conviction thereof be deemed guilty of a misdemeanor, and shall be punished by a fine of not less than fifty dollars nor more than five hundred dollars, or by imprisonment in the county jail not more than ninety days, or by both such fine and imprisonment in the discretion of the court.

Approved May 7, 1913.

Act No. 222, P. A. 1913.

An Act to prevent and punish the sale of unclean and insanitary cream and milk and the use thereof in the manufacture of food products and to prohibit unclean and insanitary conditions of creameries, cheese factories, ice cream factories and milk dealers' establishments or outfits and fixing standards of sanitary milk and cream, and to regulate the sale and transportation of the same.

The People of the State of Michigan enact:

SECTION 1. For the purpose of this act, the term "milk" shall mean the fresh, clean, lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within eight days before and four days after calving, and contains not less than eight and one-half per cent of solids not fat, and not less than three per cent of milk fat; and the term "cream" shall mean that portion of milk, rich in milk fat, which rises to the surface of milk on standing, or is separated from it by centrifugal force, is fresh and clean, and contains not less than eighteen per cent of milk fat. Milk which shall be drawn from cows that are kept in barns or stables which are not reasonably well lighted and ventilated, or that are kept in barns or stables that are filthy from an accumulation of animal feces and excreta or from any other cause, or milk which shall be drawn from cows which are themselves in a filthy condition; or milk kept or transported in dirty, rusty or open-seamed cans or other utensils; or milk that is stale, putrescent, or putrid; or milk to which has been added any unclean, or unwholesome foreign substance; or milk which has been kept exposed to foul or noxious air or gases in barns occupied by animals, or kept exposed in dirty, foul or unclean places or conditions, is hereby declared to be insanitary milk. Cream produced from any such aforesaid insanitary milk; or cream produced by the use of a cream separator, which separator had not been thoroughly washed, cleansed and scalded after previous use in the separation of cream from milk; or cream produced by the use of a cream separator placed or stationed in any unclean or filthy room or place or in any building containing a stable wherein are kept cattle or other animals, unless such cream separator is so separated and shielded by a partition from the stable portion of such building as to be free from all foul or noxious air or gases which issue or may issue from such place or stable; or cream that is stale, putrescent, or putrid; or cream that is kept or transported in dirty, rusty or open-seamed cans or other utensils; or cream which has been kept exposed to foul or noxious air or gases in barns occupied by animals, or in dirty, foul, or unclean places or conditions, is hereby declared to be insanitary cream.

SEC. 2. No person shall by himself, his servant or agent, or as the servant or agent of any other person, or as the officer, servant or agent of any firm or corporation, sell or offer for sale, furnish or deliver, or have in possession or under his control with intent to sell or offer for sale, or furnish, or deliver to any person, firm or

corporation as food for man, or to any creamery, cheese factory, milk condensing factory, or milk or cream dealer, any insanitary milk or any insanitary cream.

SEC. 3. No person shall by himself, his servant or agent, or as the servant or agent of any other person, or as the servant or agent of any firm or corporation, manufacture for sale any article of food for man from any insanitary milk or from any insanitary cream.

SEC. 4. All premises and utensils used in the handling of milk, cream, and by-products of milk, and all premises and utensils used in the preparation, manufacture, or sale, or offering for sale of any food product for man from milk or cream or the by-products of milk, which shall be kept in an unclean, filthy or noxious condition are hereby declared to be insanitary. It shall be unlawful for any person, firm, or corporation engaged in selling, or furnishing milk, cream, or any by-products of milk, intended for use as food for man; and it shall be unlawful for any person, firm or corporation engaged in selling or furnishing milk, cream, or any by-products of milk, to any creamery, cheese factory, milk condensing factory, or to any place where such milk, cream or by-products of milk are manufactured or prepared into a food product for man, and for sale as such; and it shall be unlawful for any milk dealer, or an employe of such milk dealer, or any person, firm, or corporation, or the employ [employe] of such person, firm, or corporation, who operates a creamery, cheese factory, milk condensing factory, or who manufactures or prepares for sale any article of food for man from milk, cream, or by-product of milk, or who manufactures, re-works, or packs butter for sale as a food product, to maintain his premises and utensils in an insanitary condition.

SEC. 5. Any person, firm or corporation, not a common carrier who receives from a common carrier in cans, bottles or other vessels any milk, or cream, ice cream or other dairy product intended as food for man, which has been transported over any railroad or boat line or by other common carrier, when such cans, bottles or vessels are to be returned, shall cause the said cans, bottles, or other vessels to be thoroughly washed and cleansed before return shipment.

SEC. 6. Any person who by himself, his servant or agent, or as the servant or agent of any other person, or as the officer, servant or agent of any firm or corporation, who violates any provision of this act shall, upon conviction thereof, be punished by a fine of not more than one hundred dollars for each and every offense, or shall be imprisoned in the county jail not more than sixty days.

Approved May 7, 1913.

Act No. 224, P. A. 1913.

An Act to amend sections three and four of act number seventy of the Public Acts of nineteen hundred nine, entitled "An act to regulate the manufacture and sale of ice cream within the limits of the State of Michigan."

The People of the State of Michigan enact:

SECTION 1. Sections three and four of act number seventy of the Public Acts of nineteen hundred nine, entitled "An act to regulate the manufacture and sale of ice cream within the limits of the State of Michigan," is hereby amended to read as follows:

SEC. 3. Ice cream shall be deemed to be adulterated within the meaning of this act:

First, If it shall contain boric acid, formaldehyde, saccharin, or any other added substance or compound that is deleterious to health;

Second, If it shall contain salts of copper, iron oxide, ocres or any coloring substance deleterious to health: *Provided*, That this paragraph shall not be construed to prohibit the use of harmless coloring matter in ice cream when not used for fraudulent purposes;

Third, If it shall contain any deleterious flavoring matter, or flavoring matter not true to name;

Fourth, If it be an imitation of, or offered for sale under the name of another article;

Fifth, If it contains less than ten per centum milk fat, except where fruit or nuts are used for the purpose of flavoring when it shall not contain less than eight per

centum milk fat. Nothing in this act shall be construed to prohibit the use of not to exceed seven-tenths of one per centum of pure gelatin, gum tragacanth or other vegetable gums.

SEC. 4. The standard of ice cream in this State and for the purpose of this act is hereby declared to be a frozen product made from milk, cream, eggs and sugar with or without a natural flavoring and the gums mentioned in the preceding section and contains not less than ten per cent of milk fat. Fruit ice cream is a frozen product made from milk, cream, eggs and sugar and sound, clean, mature fruits, and contains not less than eight per cent of milk fat. Nut ice cream is a frozen product made from milk, cream, eggs, sugar and sound, non-rancid nuts, and contains not less than eight per cent of milk fat.

Approved May 7, 1913.

Act 250, P. A. 1913.

An Act providing for the registration of the purchasers of guns, pistols, other fire-arms and silencers for fire-arms and providing a penalty for violation.

The People of the State of Michigan enact:

SECTION 1. Every person, firm or corporation engaged in any way or to any extent in the business of selling at retail guns, pistols, other fire-arms and silencers for fire-arms shall keep a register in which shall be entered the name, age, occupation and residence (if residing in the city with the street number of such residence) of each and every purchaser of such guns, pistols, other fire-arms or silencers for fire-arms together with the number or other mark of identification, if any, on such gun, pistol, other fire-arms or silencer for fire-arms, which said register shall be open to the inspection of all peace officers at all times.

SEC. 2. Every person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and shall upon conviction be subject to a fine of not more than fifty dollars or to imprisonment in the county jail for not more than ten days or to both such fine and imprisonment in the discretion of the court.

SEC. 3. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved May 7, 1913.

Act No. 255, P. A. 1913.

An Act to amend section seven of act number eighty-one of the Laws of Michigan of eighteen hundred seventy-three, entitled "An act to establish a State Board of Health; to provide for the appointment of a superintendent of vital statistics, and to assign certain duties to local boards of health," being compiler's section four thousand four hundred three of the Compiled Laws of eighteen hundred ninety-seven, as amended by act number eighteen of the Public Acts of nineteen hundred five.

The People of the State of Michigan enact:

SECTION 1. Section seven of act number eighty-one of the Laws of Michigan of eighteen hundred seventy-three, entitled "An act to establish a State Board of Health; to provide for the appointment of a superintendent of vital statistics, and to assign certain duties to local boards of health," being compiler's section four thousand four hundred three of the Compiled Laws of eighteen hundred ninety-seven, as amended by act number eighteen of the Public Acts of nineteen hundred five, is hereby amended to read as follows:

SEC. 7. The sum of fifteen thousand dollars per annum, or so much thereof as may be deemed necessary by the State Board of Health, is hereby appropriated to pay the salary of the secretary, to meet the contingent expenses of his offices, and the expenses of the board, to pay for necessary instruments, to pay for special investigations, and the collection of statistics of sickness, to pay for the compiling, publishing and distribution of such circulars and pamphlets as will promote the best interests of the public health, to pay the expense of conferences of

health officers and of sanitary conventions and exhibitions to be held in cities and towns of the State, and to meet such other expenses as may be incurred by the board in the prosecution of its work which may not be otherwise provided for, and to comply with the provisions of section four thousand seven hundred ninety-six of the compiled laws of eighteen hundred ninety-seven, and to generally promote the public health. All expenses incurred under the provisions of this act shall be certified by the secretary of the board to the Board of State Auditors and allowed by them. The sum so allowed shall be paid from the State treasury on the warrant of the Auditor General and charged to the appropriation account of said Board of Health. And not to exceed twelve thousand dollars shall be expended by said Board of Health in any one year for the employment of additional clerks in the office of said board, under the provisions of act number one hundred seventy-three of the laws of eighteen hundred seventy-one, entitled "An act to provide for the payment of the salaries of the State officers," being section one hundred sixty-five of the compiled laws of eighteen hundred ninety-seven.

This act is ordered to take immediate effect.

Approved May 7, 1913.

Act 274, P. A. 1913.

An Act to provide for the medical and surgical treatment of children who are afflicted with a curable malady or deformity, and whose parents are unable to provide proper treatment, providing for the expenses thereof, and prescribing the jurisdiction of the probate court in such cases.

The People of the State of Michigan enact:

Section 1. Whenever any agent of the board of corrections and charities, supervisor, superintendent of the poor, or physician, shall find within his county any child who is deformed or afflicted with a malady which can be remedied, and whose parents or guardians are unable to provide proper care and treatment, it shall be the duty of such agent, supervisor, superintendent of the poor, or physician to make a report of such condition to the probate judge of the county in which such child resides. Upon the filing of such a report with the judge of probate it shall be his duty to cause a thorough investigation to be made through the county agent, or a superintendent of the poor, and a physician appointed by him for that purpose.

Sec. 2. If upon investigation the judge of probate is satisfied that the parents or guardians are unable to provide proper medical or surgical treatment, and the physician appointed to make the examination shall certify that, in his opinion, the deformity or malady is of such a nature that it can be remedied, the judge of probate may enter an order directing that said child be conveyed to the university hospital at Ann Arbor for free treatment to be paid for by the state as hereinafter provided: Provided, That no such child shall be sent to or received into said hospital unless in the judgment of the physician in charge thereof, there is a reasonable chance for him to be benefited by the proposed medical or surgical treatment, and for this purpose a complete history of the case shall be furnished by the examining physician.

Sec. 3. It shall be the duty of the superintendent of the university of Michigan hospital, upon receiving such child, to provide for such child a cot or bed or room in the university hospital, and he shall also assign or designate the clinic of the university hospital to which the patient shall be assigned for the treatment of the deformity or malady in each particular case, the care and treatment of such child, and the physician or surgeon in charge shall proceed with all proper speed to perform such operation and bestow such treatment upon such child as in his judgment shall be proper.

Sec. 4. No compensation shall be charged or allowed to the admitting physician of said hospital, or to the physician or surgeon or nurse who shall treat said child, other than the salary respectively received from the board of regents of the university of Michigan.

Sec. 5. The superintendent of the university hospital shall keep a correct account of the medicine, nursing, food and necessities furnished to said child, and shall make and file with the auditor general, an affidavit containing an itemized

statement as far as possible of the expenses incurred at said hospital in the treatment, nursing and care of said child in accordance with the rates fixed by the regents.

SEC. 6. Upon filing said affidavit with the auditor general, it shall be the duty of said auditor general forthwith to draw an order on the treasurer of the state of Michigan for the amount of such expenditure, and forward the same to the treasurer of the university of Michigan. It shall be the duty of the auditor general upon receipt thereof to credit the amount thereof to the university of Michigan, in accordance with his warrant drawn by him for the university hospital.

SEC. 7. The county agent or superintendent of the poor shall receive the sum of three dollars per day, except in counties where such officer or officers shall receive a fixed salary, and his actual expenses while making the investigation herein provided, upon the order of the judge of probate. All claims of the county agent or superintendent of the poor for making the investigations, and actual traveling expenses and a fee of five dollars for the physician for making the examination upon the order of the probate judge under the provisions of this act, and all expenses incurred in conveying such children to and from the university hospital shall, when approved by the judge of probate ordering such services, be audited by the auditor general and paid out of the general fund. The expenses of sending such children home may be paid by the hospital and charged in the regular bill for maintenance in the discretion of the superintendent of the hospital when he is satisfied that the parents or guardians are unable to bear such necessary expense.

Approved May 8, 1913.

Act 340, P. A. 1913.

An Act to prevent and punish the sale of immature and unwholesome calves and veal.

The People of the State of Michigan enact:

SECTION 1. No person shall for the purpose of selling, kill a calf less than four weeks old, and no person shall sell the meat of any such calf or have the same in his possession with intent to sell the same either by himself, his agents, or servants.

SEC. 2. Whoever shall do any of the acts or things prohibited by this act, or in any way violate any of its provisions, shall be deemed guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars, and the costs of the prosecution, or by imprisonment in the county jail not more than ninety days, or by both such fine and imprisonment in the discretion of the court.

SEC. 3. This act is immediately necessary for the public health.

Approved May 13, 1913.

Act No. 348, P. A. 1913.

An Act to establish a State sanatorium in the township of Jerome, county of Midland, State of Michigan, to be known as the Central Michigan Sanatorium, for the care and treatment of persons having tuberculosis, and making appropriations therefor, and to provide a tax to meet the same.

The People of the State of Michigan enact:

SECTION 1. A State sanatorium to be known as the Central Michigan Sanatorium is hereby established in the township of Jerome, county of Midland, in Michigan, for the care and treatment of persons afflicted with tuberculosis.

SEC. 2. The board of trustees of the State Sanatorium at Howell, created by act number two hundred fifty-four of the public acts of nineteen hundred five, shall constitute the board of trustees of the Central Michigan Sanatorium herein provided for.

SEC. 3. For the purpose of this act, the board of trustees and their successors in

office shall be a body corporate, with all the powers necessary to carry into effect this act.

SEC. 4. Said board of trustees shall have the general control of the property and affairs of the sanatorium, and shall take such action as shall be necessary to carry out the purposes of this act.

SEC. 5. The board of trustees shall appoint a medical superintendent, not a member of said board, who shall be a legally qualified physician, of at least six years' experience in the practice of his profession, and who shall be chosen with a special view to his professional and executive ability. Such medical superintendent shall, in all matters pertaining to the sanatorium, be under the general supervision of the board of trustees, who may remove him at any time and appoint his successor.

SEC. 6. Said board of trustees shall elect from its members a president, and shall appoint a secretary and a treasurer. The treasurer shall give a bond to the people of the State of Michigan for the faithful performance of his trust, in the penal sum of twenty-five thousand dollars, to be approved by the Governor and filed with the Secretary of State. Said secretary or treasurer may at any time be removed, and his successor appointed by the Governor on the recommendation of said board of trustees in its discretion.

SEC. 7. The medical superintendent, with the consent of the board of trustees, shall appoint such other officers, assistants and employes in and for the sanatorium as may be from time to time necessary to carry into effect this act: *Provided, however*, That all medical officers shall be well educated physicians. All such officers, assistants and employes shall be under the direct supervision of the medical superintendent, and may be removed by him. In case of removal by the medical superintendent of any such officers, assistants or employes, said medical superintendent shall forthwith report same to said board of trustees.

SEC. 8. The board of trustees shall, from time to time, determine the salaries and allowances of the officers, assistants and employes of said sanatorium: *Provided*, That the salary of said medical superintendent shall not exceed the sum of two thousand dollars annually.

SEC. 9. The board of trustees is hereby directed to establish such by-laws as it may deem necessary and expedient for defining the duties of officers, assistants and employes, for fixing the conditions of admission, support and discharge of patients, and for conducting in a proper manner the professional and business affairs, also to ordain and enforce a suitable system of rules and regulations for the internal government, discipline and management of the sanatorium.

SEC. 10. The board of trustees shall have authority to receive and hold property or money as endowment or otherwise for said sanatorium, or to purchase a site and to cause to be erected thereon suitable buildings for said sanatorium and to provide for the equipment of said buildings. The trustees shall have power to make all contracts and employ all agents necessary to carry into effect this act.

SEC. 11. Said board shall meet at the sanatorium at least semi-annually, at which time a written report of the affairs and conditions of the sanatorium and of the patients therein, to be prepared by the medical superintendent, shall be submitted to and carefully examined by the board. The board shall at such meetings personally inspect the sanatorium and shall examine and audit all bills and accounts. At the annual meeting, which shall be held in July, the board of trustees shall make a detailed report and shall examine the report and audit the accounts of the treasurer, which shall be presented at said annual meeting, and shall transmit it with its annual report to the Governor, for publication by the Board of State Auditors.

SEC. 12. The members of the board of trustees shall receive no compensation for their services, but expenses incurred in the performance of their duties shall be audited by the board of trustees, certified by the president and secretary, and paid by its treasurer.

SEC. 13. The medical superintendent shall be chief executive officer of the sanatorium. He shall have general superintendence of the buildings, grounds, furniture, fixtures and stock, and the direction and control of all persons therein, subject to the by-laws and regulations established by the board of trustees. He or his representative shall daily ascertain the condition of each and all patients, and prescribe or direct their treatment. He shall cause full and fair records of all his official acts and entire business and operation of the sanatorium to be kept regularly, from day to day, in books provided for that purpose, in the manner and to the extent prescribed in the by-laws, and he shall see that all the accounts and records are fully made up to the last day of June, and present the same to the

board of trustees at its annual meeting. It shall be the duty of the medical superintendent to admit any of the board of trustees into every part of the sanatorium, and to exhibit to him or them, on demand, all the books, papers, accounts and writings belonging to the sanatorium or pertaining to its business, management, discipline or government; also to furnish copies, abstracts and reports whenever required so to do by said board. The medical superintendent shall make, in a book kept for that purpose, at the time of reception, a record, with the date of the same, of the name, age, residence, occupation and such other statistics in regard to every patient admitted to the sanatorium as the by-laws may require.

SEC. 14. The treasurer shall have the custody of all moneys, bonds, notes, mortgages, and other securities of the sanatorium, and of obligations to the sanatorium. Said moneys shall be disbursed only for the uses and purposes of the sanatorium, and in the manner prescribed by the by-laws on itemized vouchers allowed by the board of trustees, and so certified by the president and secretary of the board. The treasurer shall keep full and accurate accounts of all receipts and payments in the manner directed in the by-laws, and such other accounts as the board of trustees shall prescribe. He shall render statements of accounts of the several books, and of the funds and other property in his custody, whenever required so to do by the board of trustees. He shall have all accounts and records pertaining to his office fully made to the last day of June, and present the same to the board of trustees at its annual meeting.

SEC. 15. There shall be received into said sanatorium, such persons as shall be proved by proper bacteriological or clinical examination to be suffering from tuberculosis. Such patients shall be of two classes, namely: First, persons resident of this State who on account of their poverty are unable to pay the necessary expenses for residence at said sanatorium; and second, residents of this State who are able to pay such fees as shall be fixed by the board of trustees.

SEC. 16. In case of any person designated in section fifteen under the first class, after such person shall have furnished a certificate of the superintendent of the poor of his county or township, approved by the judge of probate of said county, that such person belongs in said first class, the board of trustees shall have discretionary power to pay his necessary expenses not less than five dollars nor more than seven dollars per week, and may issue a voucher properly itemized and sworn to the Auditor General that such amount has been expended for the benefit of such person, whereupon the Auditor General shall draw his warrant on the State Treasurer therefor; and any such sums are hereby appropriated, and shall be paid out of any moneys in the general fund not otherwise appropriated, and the Auditor General shall charge all such money to the county of which such person is a resident or to which he or she belongs, to be collected quarterly and returned to the general fund in the State treasury.

SEC. 17. Any superintendent of the poor in any county of this State may send, or cause to be sent with the approval of the judge of probate of said county, to the sanatorium any person who, under the rules of the sanatorium is entitled to admission therein, who is a charge upon the county. Before sending any patient to the sanatorium, under the provisions of this act, such superintendent of the poor shall correspond with the superintendent of the sanatorium, and conform to the rules established by the board of trustees, and he shall cause the patient to be comfortably clothed, and shall provide the patient with suitable clothing while the patient remains at the sanatorium, and shall defray the necessary traveling expenses in going to and returning therefrom, and provided the patient with such articles of necessity and convenience as are required by the rules of the sanatorium.

SEC. 18. All persons entitled to admission to the sanatorium who are not a charge upon the county, but who, on account of their poverty, are unable to provide themselves with suitable clothing or other necessary articles, shall receive the same aid from the superintendent of the poor of their respective counties while attending the sanatorium as is provided in this act for those who are a county charge. All proper expenses incurred by the superintendents of the poor under this or the preceding section shall be a charge against their respective counties, and shall be defrayed out of the poor fund of such county.

SEC. 19. The charges for the support of the patients in said sanatorium who are able to pay the same or have persons or kindred bound by law to maintain them, shall be paid to the medical superintendent by such patients, persons or kindred, at a rate to be determined by the board of trustees of said sanatorium.

SEC. 20. All moneys collected by the medical superintendent shall be passed over to the treasurer of the sanatorium and his receipt taken therefor, such moneys

to be disbursed by the treasurer under provisions of section fourteen of this act.

SEC. 21. The sum of twenty thousand dollars is hereby appropriated for the fiscal year ending June thirty, nineteen hundred fourteen, for the purpose of purchasing a site, of erecting, constructing and equipping the sanatorium and buildings herein provided for, and to pay the necessary expenses of the members of the board of trustees and for the maintenance of the sanatorium provided for in this act. The Treasurer of the State shall, on the warrant of the Auditor General and on the statement of the architect and of the board of trustees, pay over to the treasurer of the said sanatorium the above named sum in such amounts as may from time to time in the judgment of the architect and board of trustees be deemed necessary.

SEC. 22. The sum of ten thousand dollars is hereby appropriated for the fiscal year ending June thirty, nineteen hundred fifteen, to pay the necessary expenses of the members of the board of trustees and for the maintenance of the sanatorium provided for in this act. The Treasurer of the State shall, on the warrant of the Auditor General and of the board of trustees, pay over to the treasurer of the said sanatorium the above named sum in such amounts as may from time to time, in the judgment of the board of trustees be deemed necessary.

SEC. 23. The Auditor General shall add to and incorporate in the State tax for the year nineteen hundred thirteen, the sum of twenty-thousand dollars, and for the year nineteen hundred fourteen, the sum of ten thousand dollars, which when collected shall be credited to the general fund to reimburse the same for the money hereby appropriated.

This act is ordered to take immediate effect.

Approved May 13, 1913.

Act 350, P. A. 1913.

An Act to enable counties to establish and maintain public hospitals, levy a tax and issue bonds therefor, elect hospital trustees, maintain training schools for nurses, provide suitable means for the care of tuberculous persons, and to make possible the ultimate establishment of an adequate supply of hospitals.

The People of the State of Michigan enact:

SECTION 1. Any county may establish a public hospital in the following manner: Whenever the board of supervisors of any county shall be presented with a petition signed by five per cent of the electors of such county, asking that bonds be issued and that an annual tax may be levied for the establishment and maintenance of a public hospital at a place in such county named therein, and shall specify in their petition the maximum amount of money proposed to be expended in purchasing, leasing or building said hospital, it shall at the next general election to be held in the county, after first giving ninety days' notice thereof in one or more newspapers published in the county, if any be published therein, and by posting such notice, written or printed, in each voting precinct of the county, which notice shall include the text of the petition and state the amount of the bonds to be issued and the amount of the tax to be levied upon the assessed property of the said county, which tax shall not exceed two mills on the dollar, for a period of time not exceeding fifteen years, submit to the qualified electors thereof, the question whether bonds shall be issued in the amount of $———— and whether there shall be levied on the assessed property of such county a tax of ———— mills on the dollar for the purchase of real estate for hospital purposes, or for the purchasing, leasing or construction of hospital buildings, and for maintaining the same, or for either or all of said purposes.

SEC. 2. Said election shall be held at the usual places in such county for the election of county officers, the vote to be canvassed in the same manner as that for county officers. The ballots to be used at any election at which the said question is submitted shall be printed with a statement substantially as follows:

Shall the county of ———— issue bonds in the sum of ———— dollars and levy a ———— mill tax to provide for the payment of same for the purpose of purchasing, leasing or constructing, as the case may be, a public hospital, and to provide for the maintenance of same?

Yes. [ ];

Shall the county of ———— issue bonds in the sum of ———— dollars and

levy a ———— mill tax to provide for the payment of same for the purpose of purchasing, leasing, or constructing, as the case may be, a public hospital, and to provide for the maintenance of same?

No. [ ].

If a majority of the votes cast at such election be in favor of the proposition so submitted, the board of supervisors shall issue the bonds as hereinafter provided and shall levy the tax so authorized, to be collected in the same manner as other taxes are collected and credited to the hospital fund, and it shall be paid out on the order of the hospital trustees for the purposes authorized by this act and for no other purposes whatever.

SEC. 3. Should a majority of all the votes cast upon the question be in favor of establishing such county public hospital, the board of supervisors shall proceed at once to appoint seven trustees chosen from the citizens at large with reference to their fitness to such office, three of whom may be women, all residents of the county, not more than three of said trustees to be residents of the city, town or village in which said hospital is to be located, who shall constitute a board of trustees for said public hospital. The said trustees shall hold their offices until the next following November election, when seven hospital trustees shall be elected and hold their offices, two for two years, two for four years, three for six years, and who shall by lot determine their respective terms. At each subsequent November election the offices of the trustees whose terms of office are about to expire shall be filled by the nomination and election of hospital trustees in the same manner as other officers are elected, none of whom shall be practicing physicians.

SEC. 4. The said trustees shall within ten days after their appointment or election qualify by taking the oath of civil officers, and organize as a board of hospital trustees by the election of one of their number as chairman, one as secretary, and by the election of such other officer as they may deem necessary, but no bond shall be required of them. The county treasurer of the county in which such hospital is located shall be treasurer of the board of trustees. The treasurer shall receive and pay out all the moneys under the control of the said board as ordered by it, but shall receive no compensation from such board. No trustee shall receive any compensation for his services performed, but may receive reimbursements for any cash expenditures actually made for personal expenses incurred as such trustee, and an itemized statement of all such expenses and money paid out shall be made under oath by each of such trustees and filed with the secretary and allowed only by the affirmative vote of all the trustees present at a meeting of the board. The board of hospital trustees shall make and adopt such by-laws, rules and regulations for its own guidance and for the government of the hospital as may be deemed expedient for the economic and equitable conduct thereof not inconsistent with this act, and the ordinances of the city or town wherein such public hospital is located. It shall have the exclusive control of the expenditure of all moneys collected to the credit of the hospital fund, and of the purchase of a site or sites, the purchase or construction of any hospital building or buildings, and of the supervision, care and custody of the grounds, rooms or buildings purchased, constructed, leased or set apart for that purpose: Provided, That all moneys received for such hospital shall be deposited in the treasury of the county to the credit of the hospital fund, and paid out only upon warrants drawn by the auditor of said county upon the properly authenticated vouchers of the hospital board. Said board of hospital trustees shall have power to appoint a suitable superintendent or matron, or both, and necessary assistants, and fix their compensation; and shall also have power to remove such appointees; and shall in general carry out the spirit and intent of this act in establishing and maintaining a public county hospital with equal rights to all and privileges to none. Such board of hospital trustees shall hold meetings at least once each month, shall keep a complete record of all its proceedings, and four members of said board shall constitute a quorum for the transaction of business. One of said trustees shall visit and examine said hospital at least twice each month, and the board shall during the first week in October of each year file with the board of supervisors of said county a report of its proceedings with reference to such hospital, and a statement of all receipts and expenditures during the year; and shall at such times certify the amount necessary to maintain and improve said hospital for the ensuing year. No trustee shall have a personal pecuniary interest either directly or indirectly in the purchase of any supplies for said hospital, unless the same are purchased by competitive bidding.

SEC. 5. Vacancies in the board of trustees occasioned by removals, resignations or otherwise shall be reported to the board of supervisors and be filled in like

manner as original appointments, appointees to hold office until the next following November election, when such vacancy shall be filled by election in the usual manner.

SEC. 6. Whenever any county in this state shall have provided for the appointment and election of hospital trustees and has voted a tax for a term of not exceeding twenty years for hospital purposes, as authorized by law, the said county may issue bonds in anticipation of the collection of such tax in such sums and amounts as the board of hospital trustees shall certify to the board of supervisors of said county to be necessary for the purposes contemplated by such tax, but such bonds in the aggregate shall not exceed the amount which might be realized by said tax based on the amount which may be yielded on the property valuation of the year in which the tax is voted, and such bonds shall mature in fifteen years from date and shall be in sums of not less than one hundred dollars nor more than one thousand dollars drawing interest at a rate not exceeding five per cent per annum, payable annually or semi-annually, interest and principal to be paid at the office of the county treasurer of the county issuing such bonds. Said bonds shall be payable at the pleasure of the county after five years, and each of said bonds shall provide that it is subject to this condition and shall not be sold for less than par, and shall be substantially in the form provided for county bonds, but subject to changes that will conform them to the provisions of this act, and be numbered consecutively and redeemable in order of their issuance.

There is no section 7 to this act.

SEC. 8. No hospital building shall be erected or constructed under the plans and specifications made therefor and adopted by the board of hospital trustees, until approved by the state board of health, and bids advertised for according to law for other county public buildings.

SEC. 9. In counties exercising the rights conferred by this act the board of supervisors may appropriate each year in addition to tax for hospital fund hereinbefore provided for not exceeding five per cent of its general fund for the improvement and maintenance of any public hospital so established.

SEC. 10. Every hospital established under this act shall be for the benefit of the inhabitants of such county and of any person falling sick or being injured or maimed within its limits; but every such inhabitant or person who is not a pauper shall pay to such board of hospital trustees or such officer as it shall designate for such county public hospital, a reasonable compensation for occupancy, nursing, care, medicine, or attendants, according to the rules and regulations prescribed by said board, such hospital always being subject to such reasonable rules and regulations as said board may adopt in order to render the use of said hospital of the greatest benefit to the greatest number; and said board may exclude from the use of such hospital any and all inhabitants and persons who shall wilfully violate such rules and regulations. And said board may extend the privileges and use of such hospital to persons residing outside of such county, upon such terms and conditions as said board may from time to time by its rules and regulations prescribe.

SEC. 11. When such hospital is established, the physicians, nurses, attendants, the persons sick therein and all persons approaching or coming within the limits of same, and all furniture and other articles used or brought there shall be subject to such rules and regulations as said board may prescribe.

SEC. 12. Any person, or persons, firm, organization, corporation or society desiring to make donations of money, personal property or real estate for the benefit of such hospital, shall have the right to vest title of the money or real estate so donated in said county, to be controlled, when accepted by the board of hospital trustees according to the terms of the deed, gift, devise or bequest of such property.

SEC. 13. In the management of such public hospital no discrimination shall be made against practitioners of any school of medicine recognized by the laws of Michigan, and all such legal practitioners shall have equal privileges in treating patients in said hospital. The patient shall have absolute right to employ at his or her own expense his or her own physician or nurse, and when acting for any patient in such hospital the physician employed by such patient shall have exclusive charge of the care and treatment of such patient, and nurses therein shall as to such patient be subject to the directions of such physician, subject always to such rules and regulations as shall be established by the board of trustees under the provisions of this act.

SEC. 14. The board of trustees of such county public hospital may establish and

maintain in connection therewith and as a part of said public hospital, a training school for nurses.

SEC. 15. The said board of trustees shall at all times provide a suitable room for the detention and examination of all persons who are brought before the commissioners of insanity for such county: Provided, That such public hospital is located at the county seat.

SEC. 16. The board of trustees of said hospital is hereby authorized to provide, as a department of said public hospital but not necessarily attached thereto, suitable accommodations and means for the care and treatment of persons suffering from tuberculosis, and to formulate such rules and regulations for the government of said persons, and for the protection from infection of other patients and nurses and attendants in such public hospital as it may deem necessary. And it shall be the duty of all persons in charge of or employed at such hospitals, or residents thereof to faithfully obey and comply with any and all rules and regulations. Said board of hospital trustees shall, if practicable, employ as head nurse to be placed in charge of said public tuberculosis sanatorium one who has had experience in the management and care of tuberculous persons.

SEC. 17. The board of hospital trustees shall have power to determine whether or not patients presented at said public hospital for treatment are subjects for charity, and shall fix such compensation for care of patients other than those unable to assist themselves, as the said board may deem proper, the receipts therefor to be paid to the treasurer of said county and credited by him to the hospital fund.

SEC. 18. The board of supervisors of any county where no suitable provision has been made for the care of its indigent tuberculous residents, may contract with the board of hospital trustees of any public hospital for the care of such persons in the sanatorium department of said hospital upon such reasonable terms as may be agreed upon.

SEC. 19. The board of trustees of said hospital is hereby authorized to provide or establish as a department of said hospital, but not attached thereto, suitable accommodations and means for the care of dependent children. And said department shall be under the care and supervision of the trustees aforesaid of the county hospital in like manner as heretofore described in connection therewith.

Approved May 13, 1913.

FINANCIAL STATEMENT.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER PUBLIC ACT NO. 18 OF 1905), DURING THE FISCAL YEAR ENDING JUNE 30, 1913.

Expenses of members:	
Attending regular meetings	$243 44
Other expenses	119 86
Engraving, drawing, etc	308 68
Instruments and books	424 62
Paper, stationery, etc	1,141 61
Postage	1,200 00
Printing and binding	2,424 81
Secretary	2,500 00
Miscellaneous	506 76
Total	$8,869 78

NOTE.—The appropriation ($9,000) at the disposal of the State Board of Health for certain specified purposes, does not include clerk hire. The account of the appropriation ($10,000) for clerk hire is kept in the Auditor General's department, and is published in his annual report.

Respectfully submitted,

R. L. DIXON,
Secretary.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH (UNDER SECTION 7 OF ACT 132, LAWS OF 1903, AS AMENDED BY ACT 151, LAWS OF 1907), EMBALMERS' FUND, AS ALLOWED DURING THE FISCAL YEAR, 1913.

RECEIPTS.		DISBURSEMENTS.	
Fees from applicants for licenses and for renewals of licenses	$1,180 20	Expenses of members attending meetings	$176 30
		Paper, stationery, etc	205 61
		Postage	250 00
		Printing and binding	265 41
		Drawing, engraving, etc	18 32
Total receipts	$1,180 20	Compensation of extra clerks	135 00
		Miscellaneous	130 62
		Total disbursements	*$1,181 26

*To amount ($1.06) paid out in excess of receipts.

Approved:
R. L. DIXON,
Secretary.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE BOARD OF HEALTH, LABORATORY DEPARTMENT, (UNDER SECTION 5 OF ACT 122, LAWS OF 1909), AS ALLOWED DURING THE FISCAL YEAR ENDING JUNE 30, 1913.

RECEIPTS.		DISBURSEMENTS.	
State Treasurer, by appropriation	$5,000 00	Salaries of bacteriologist and assistant	$3,700 00
Fees for chemical, bacteriological and toxicological examinations.	480 25	Salaries of clerks	1,380 00
		Postage	151 00
		Freight and express	8 40
		Books	12 00
Total receipts	$5,480 25	Laboratory supplies	160 10
		Traveling expenses	7 37
		Printing and stock	39 32
		Telephone	1 40
		Miscellaneous	17 70
		Unexpended balance	2 96
		Total disbursements	$5,480 25

PART II.

COMMUNICABLE DISEASES IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1912, AND PRECEDING YEARS.

MORBIDITY AND MORTALITY STATISTICS.

Morbidity and mortality statistics are the bookkeeping of public health work and the ultimate measure of its efficiency. It will be noticed that the figures for the year 1912 show a saving of over 500 lives in this state from communicable diseases—with which the Department of Health deals

—as compared with the average death rates for the preceding three years. Only one disease showed an increase in its death rate—pneumonia—an increase of three per cent over the overage rate for 1909-1911. Below is given the trial balance showing the actual lives saved and the per cent of decrease and increase over the years mentioned.

POPULATION.

To obtain correct and complete Vital Statistics it is essential to have a correct enumeration of the population classified according to age, sex, etc., together with a complete and accurate registration of sickness and death. In comparing the Vital Statistics of different communities, or one year with another in the same community, it is necessary to state the deaths and other statistical data in terms of the population, otherwise no true comparison can be instituted.

The actual population is known only by census enumerations. For years intervening between two census enumerations, estimates of the population are made.

The two following tables, respectively, show the population for Michigan for each of the years, 1884-1912, and the estimated population for the state in 1912, by age groups and sex.

Table showing the populations of Michigan for the years 1884–1912.

Years.	*Population.
1884	**1,853,658**
1885	1,893,697
1886	1,933,735
1887	1,973,774
1888	2,013,812
1889	2,053,851
1890	**2,093,889**
1891	2,130,827
1892	2,167,765
1893	2,204,703
1894	**2,241,641**
1895	2,271,531
1896	2,301,421
1897	2,331,311
1898	2,361,201
1899	2,391,091
1900	**2,420,982**
1901	2,450,872
1902	2,475,499
1903	2,502,758
1904	**2,530,016**
1905	2,557,275
1906	2,584,533
1907	2,611,792
1908	2,639,050
1909	2,666,309
1910	**2,810,173**
1911	2,856,866
1912	2,903,559

*Population in bold faced type indicates census years, population for other years being estimated

Table showing the estimated population of Michigan in 1912 by age groups and sex.

Age groups.	Total.	Males.	Females.
All ages	2,903,559	1,506,489	1,397,070
Under 1 year	63,556	32,154	31,402
1 year	59,101	29,795	29,306
2 years	63,021	32,153	30,868
3 years	62,463	31,729	30,734
4 years	61,381	30,945	30,436
Under 5 years	309,522	156,776	152,746
5 to 9 years	278,091	140,729	137,372
10 to 14 years	256,676	129,446	127,230
15 to 19 years	273,908	139,647	134,261
20 to 24 years	275,924	143,208	132,716
25 to 29 years	251,363	132,912	118,451
30 to 34 years	220,396	115,449	104,947
35 to 39 years	198,278	103,906	94,372
40 to 44 years	175,845	92,244	83,601
45 to 49 years	157,389	83,119	74,270
50 to 54 years	143,612	76,799	66,813
55 to 59 years	107,901	58,426	49,475
60 to 64 years	86,284	45,687	40,597
65 to 69 years	70,499	37,256	33,243
70 to 74 years	45,586	23,727	21,859
75 to 79 years	28,757	14,896	13,861
80 years and over	20,041	10,030	10,011
Unknown	3,487	2,232	1,255

"DEATH RATES."

By this term is meant the ratio which the number of deaths in a community in a given time bears to the living population in that community. The unit of time is generally one year, while the unit of population is taken as 1,000, 10,000 or 100,000. To illustrate the meaning of "death rate": If 20 persons should die in one year in a town which has a population of 1,000, the annual death rate would be said to be "20 per 1,000;" if 30 persons died in one year in a town having 1,500 population the annual rate is again "20 per 1,000." The object of using the term death rate is to enable one to compare on the same basis the sanitary conditions in communities, which differ in population, and the same community at different times. The death rates for particular diseases are calculated on a basis of 100,000 population, as this tends to avoid the use of decimals, and simplifies tabulation.

INFLUENCE OF AGE AND SEX ON DEATH RATE.

This chapter is confined to the consideration of means of measuring the modification of the general death rate, and the rate of certain specific diseases, which may result from varying age and sex-constitution of a population.

Dr. Ogle has summed up the influence of age and sex distribution of

the population on death rates in the following words: "It is necessary to point out that two places might be on a perfect equality with each other as regards their climate, their sanitary arrangements, their closeness of aggregation, as also the habits and occupations of their inhabitants, and yet might have very different general death rates owing to differences in the age and sex-distribution of their respective populations. Such a supposed case, of course, is scarcely likely to present itself, for when the prevalent occupations are the same in two places the age and sex-distribution is almost certain to be the same also. But in places where the prevalent occupations are not the same, there are often very great differences in the age and sex-distribution of the populations, and such as seriously affect the general death rates."

As an illustration of the above quotation the following table, taken from the annual report of the Secretary of State's Vital Statistics of Michigan for the year 1910, is reproduced:

Death rates from all causes per 1,000 of each age group and each sex, in Michigan, in 1910.

Age groups.	Total.	Males.	Females.
All ages	14.2	15.0	13.4
Under 5 years	35.7	39.5	31.9
5- 9 years	3.4	3.4	3.3
10-14 years	2.4	2.5	2.4
15-19 years	3.9	3.9	3.8
20-24 years	5.5	5.3	5.7
25-29 years	5.8	5.9	5.7
30-34 years	5.7	5.7	5.8
35-39 years	6.9	6.8	7.0
40-44 years	7.6	7.8	7.4
45-49 years	10.3	10.6	9.9
50-54 years	13.1	13.4	12.8
55-59 years	18.3	19.0	17.5
60-64 years	27.4	29.7	24.9
65-69 years	41.7	44.4	38.8
70-74 years	68.1	71.3	64.6
75-79 years	107.5	112.9	101.5
80 years and over	196.3	203.4	189.0

A study of the above table shows that between the ages of 5 and 55. the death rate per 1,000 living at each age group is lower than the combined death rate at all ages. Under 5 and over 55, the death rate is higher than the combined death rate at all ages. It is evident, therefore, that, as the proportion of the total population living at these different age-groups differs greatly in different communities, the relative numbers subject to the higher death rates at the two extremes of age will differ to a corresponding extent, and consequently the relative total death rate for all ages will vary.

The age distribution of populations is, therefore, of great importance in determining the relative value of their death rates. If they are identical in two localities, then any difference in their death rates may be referred to influences peculiar to each place.

The same reasoning applies to sex-distribution. At nearly all ages the death rates of females is lower than that of males. Consequently an excess of females must tend to lower the death rate of a locality, without implying a necessarily better sanitary condition.

PNEUMONIA IN MICHIGAN IN 1912 AND PRECEDING YEARS.

The disease pneumonia became reportable to the State Board of Health Department in 1904, but, as may be seen by Table 1, many physicians fail to notify the local health officers of the existence of their non-fatal cases, as is shown by the small excess of cases over deaths.

A measure of quarantine and isolation has been adopted by this Board, and a circular of information regarding the infectious nature of this disease has been generally distributed. Pneumonia (all forms) has a greater mortality than tuberculosis, and should be attacked by all health workers.

While, as previously stated, pneumonia showed a three per cent increase in its death rate of 1912 compared with the average rate for three years immediately preceding, still, by the figures shown in Table 1, there seems to be a downward trend in the death rates during the past five years, compared with the average rate for the two former five-year periods. Comparing the average rate for the five years, 1908-1912, with the rate for 1903-1907, and we find a decrease of ten per cent.

TABLE 1.—*The prevalence of pneumonia, in Michigan, in each of the fifteen years, 1898–1912.*

Years.	*Cases.	Deaths.	Deaths per 100,000 population.
1898	.....	2,047	86.7
1899	.....	2,479	103.7
1900	.....	2,388	98.6
1901	.....	2,901	118.4
1902	.....	2,637	106.5
Average, 1898–1902	.....	2,490	102.9
1903	.....	2,607	104.2
1904	3,790	2,646	104.6
1905	3,227	2,417	94.5
1906	3,387	2,621	101.4
1907	3,976	3,018	115.6
Average, 1903–1907	†3,595	2,662	104.1
1908	3,177	2,313	87.6
1909	3,142	2,265	84.9
1910	3,671	2,785	99.1
1911	3,452	2,763	96.7
1912	3,592	2,796	96.3
Average, 1908–1912	3,407	2,584	93.1

*Previous to 1904, pneumonia was not reported to this Department.
†Four-year average.

GEOGRAPHICAL DISTRIBUTION OF PNEUMONIA.

In order to learn what effect, if any, climatic conditions have on the prevalence of pneumonia, the State has been divided into eleven geographical divisions, the counties in each of which would be likely to have a similar climate.

Judging by the death rates shown in Table 2, pneumonia was most prevalent in the Southeastern division and least prevalent in the Southwestern division. Arranging the divisions in the order of greatest death rates per 100,000 inhabitants, we have the Southeastern (156.9), Upper Peninsular (96.7), Southern Central (95.0), Western (94.1), Bay and Eastern (93.2), Central (89.2), Northern Central (86.4), Northwestern (85.0), Northern (81.8), Northeastern (80.1) and Southwestern (77.7). Compared with the average death rate for the State as a whole (97.9), the counties in which the disease was on the average unusually prevalent for the nine years were: Wayne (169.9), Lapeer (121.2), and Kalamazoo (117.5).

TABLE 2.—*The geographical distribution of pneumonia, in Michigan, in the nine years, 1904–1912, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION	300,912	378	291	96.7
Alger County	7,256	8	7	96.5
Baraga County	5,829	5	5	85.8
Chippewa county	23,366	30	23	98.4
Delta county	29,543	35	34	115.1
Dickinson county	19,990	19	17	85.0
Gogebic county	19,877	19	18	90.6
Houghton county	79,321	111	85	107.2
Iron county	11,324	13	11	97.0
Keweenaw county	6,115	14	5	81.8
Luce county	4,304	5	5	116.2
Mackinac county	8,863	7	6	67.7
Marquette county	42,115	65	40	95.0
Menominee county	25,905	26	24	92.6
Ontonagon county	8,147	10	5	61.4
Schoolcraft county	8,957	11	6	67.0
NORTHWESTERN DIVISION	94,117	128	80	85.0
Benzie county	11,191	12	10	89.4
Grand Traverse county	24,563	27	20	81.4
Leelanau county	10,854	10	8	73.7
Manistee county	26,700	52	25	93.6
Wexford county	20,809	27	17	81.7
NORTHERN DIVISION	90,409	99	74	81.8
Antrim county	15,289	17	14	91.6
Charlevoix county	18,365	21	13	70.8
Cheboygan county	18,221	20	16	87.8
Crawford county	4,265	5	4	93.8
Emmet county	18,858	22	16	84.8
Kalkaska county	7,996	6	5	62.5
Otsego county	7,415	8	6	80.9
NORTHEASTERN DIVISION	64,929	63	52	80.1
Alcona county	6,799	5	4	58.8
Alpena county	20,455	18	18	88.0
Iosco county	10,357	8	7	67.6
Montmorency county	3,725	6	4	107.4
Ogemaw county	9,603	11	9	93.7
Oscoda county	2,117	5	2	94.5
Presque Isle county	11,873	10	8	67.4
WESTERN DIVISION	296,627	346	279	94.1
Kent county	150,177	179	150	99.9
Lake county	4,993	5	3	60.1
Mason county	20,774	24	19	91.5
Muskegon county	38,759	48	44	113.5
Newaygo county	19,043	18	12	63.0
Oceana county	18,421	20	17	92.3
Ottawa county	44,460	52	34	76.5
NORTHERN CENTRAL DIVISION	108,755	132	94	86.4
Clare county	9,554	10	6	62.8
Gladwin county	9,377	7	6	64.0
Isabella county	24,238	38	21	86.6
Mecosta county	19,726	23	18	91.3
Midland county	14,473	16	14	96.7
Missaukee county	10,798	13	12	111.1
Osceola county	18,670	21	15	80.3
Roscommon county	1,919	4	2	104.2

TABLE 2.—*Concluded.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
BAY AND EASTERN DIVISION	350,963	392	327	93.2
Arenac county	10,124	9	9	88.9
Bay county	65,757	73	67	101.9
Huron county	35,210	32	28	79.5
Lapeer county	26,408	49	32	121.2
Saginaw county	88,932	89	81	91.1
Sanilac county	34,424	34	27	78.4
St. Clair county	54,525	64	51	93.5
Tuscola county	35,583	42	32	89.9
CENTRAL DIVISION	326,115	393	291	89.2
Barry county	22,058	27	19	86.1
Clinton county	24,430	29	19	77.8
Eaton county	30,225	40	31	102.6
Genesee county	51,627	74	58	112.3
Gratiot county	30,138	37	28	92.9
Ingham county	48,959	56	38	77.6
Ionia county	34,333	38	31	90.3
Livingston county	17,871	22	15	83.9
Montcalm county	33,008	32	28	84.8
Shiawassee county	33,466	38	24	71.7
SOUTHWESTERN DIVISION	145,359	148	113	77.7
Allegan county	39,343	43	33	83.9
Berrien county	51,130	45	34	66.5
Cass county	19,909	23	18	90.4
Van Buren county	34,977	37	28	80.1
SOUTHERN CENTRAL DIVISION	334,792	475	318	95.0
Branch county	25,500	23	17	66.7
Calhoun county	55,912	87	54	96.6
Hillsdale county	29,762	30	23	77.3
Jackson county	49,115	88	48	97.7
Kalamazoo county	56,181	114	66	117.5
Lenawee county	48,922	53	42	85.9
St. Joseph county	23,836	26	25	104.9
Washtenaw county	45,564	54	43	94.4
SOUTHEASTERN DIVISION	572,440	936	898	156.9
Macomb county	32,846	36	30	91.3
Monroe county	32,989	40	34	103.1
Oakland county	47,633	73	54	113.4
Wayne county	458,972	787	780	169.9

*Population estimated for intercensal years.
†From nearly all localities only the fatal cases were reported.

THE PREVALENCE OF PNEUMONIA IN URBAN AND RURAL LOCALITIES.

That density of population has an effect upon the prevalence of this disease may be seen by reference to Table 3. By referring to the column headed "Average 1904-1911," it will be seen that the death rate was highest in the cities of 50,000 inhabitants and upwards, and that the rate decreased to a certain degree, with the decrease of the population with but one exception—cities from 10,000 to 25,000—they having a higher average rate than the group immediately preceding. In comparing the death rate in the rural localities with those of the urban, we find a difference of 35 per cent in favor of the rural localities.

Table 3 also shows that, in 1912, compared with the average rate, this

disease is decreasing faster in the rural localities than in the urban, the decrease being 22 per cent in the rural and only 2 per cent in the urban.

In Table 3A is shown the cities and villages comprising the first four groups of Table 3 and their death rates from pneumonia in 1912 and the average rate for the years 1904-1911. The purpose of this table is to determine the increase or decrease of the disease in these localities in the current year compared with the average year, also to compare the rate of one locality with that of another. It also serves to show which of these localities is causing the high death rates in the first four groups of Table 3.

The cities in Table 3A that showed much higher death rates from this disease in 1912 than the State as a whole (96.3), are: Adrian, Ann Arbor, Benton Harbor, Detroit, Escanaba, Kalamazoo, Marquette, Mt. Clemens and Three Rivers.

Those cities that showed much lower rates are: Boyne City, Coldwater, Dowagiac, Grand Rapids, Hillsdale, Holland, Houghton, Ironwood, Ishpeming, Laurium, Ludington, Manistee, Negaunee, Owosso, Port Huron, St. Joseph, Sault Ste. Marie and Wyandotte.

Those cities that showed an increase in their rate of 25 per cent or more in 1912 compared with their average rate, are: Ann Arbor, Benton Harbor, Cadillac and Marquette.

Those showing a decrease of 25 per cent or more over their average rate are: Boyne City, Coldwater, Dowagiac, Flint, Grand Rapids, Hancock, Hillsdale, Houghton, Ishpeming, Laurium, Ludington, Manistee, Pontiac, Port Huron, St. Joseph, Sault Ste. Marie and Wyandotte.

TABLE 3.—*The prevalence of pneumonia in urban and rural localities, in Michigan, as indicated by the death rates per 100,000 population in the several groups, for each of the years, 1904–1912.*

Localities—Grouped according to density of population.	Deaths per 100,000 population.									
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Average 1904–1911.	1912.
Cities over 50,000	153.2	125.9	185.5	183.8	142.1	161.3	163.2	149.5	157.9	156.2
Cities from 25,000 to 50,000	108.2	100.9	108.7	151.8	107.9	85.6	116.1	94.2	108.7	101.8
Cities from 10,000 to 25,000 and Calumet township	123.6	120.0	104.9	109.7	100.3	89.5	125.5	105.1	110.2	99.6
Cities and villages from 5,000 to 10,000	113.7	97.5	111.0	98.3	88.5	90.9	89.4	85.8	96.2	82.9
Cities and villages under 5,000	112.0	103.7	86.8	111.9	75.6	77.6	82.8	87.4	92.4	90.7
Total urban	126.8	112.8	127.0	137.4	108.4	112.5	124.6	114.8	120.4	118.7
Rural localities (townships)*	101.1	92.2	90.4	102.2	79.1	76.9	83.4	81.4	88.3	69.8

*Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 3A.—*The deaths from pneumonia in 1912, and preceding years, in each of the principal localities included in the first four groups in table 3.*

Localities.	1912.			Average, 1904–1911.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	10,791	13	120.5	11,184	11	98.4
Albion	6,130	6	97.9	5,383	6	111.5
Alpena	12,808	12	93.7	12,763	11	86.1
Ann Arbor	14,890	31	208.2	14,699	14	95.2
Battle Creek	26,285	23	87.5	24,751	26	105.0
Bay City	46,674	46	98.6	41,817	48	114.8
Benton Harbor	10,013	13	129.8	7,440	5	67.2
Boyne City	6,140	3	48.9	3,924	3	76.5
Cadillac	8,869	10	112.8	7,714	6	77.8
Calumet Twp.	21,079	18	85.4	18,548	18	97.0
Cheboygan	6,902	8	115.9	6,878	6	87.2
Coldwater	5,852	3	51.3	6,154	5	81.2
Detroit	515,158	963	186.9	376,881	661	175.4
Dowagiac	5,316	3	56.4	4,707	5	106.2
Escanaba	13,893	23	165.6	12,392	18	145.3
Flint	46,439	45	96.9	22,129	29	131.0
Grand Haven	6,062	6	99.0	5,639	5	88.7
Grand Rapids	118,189	61	51.6	104,104	111	106.6
Hancock	9,962	10	100.4	7,768	12	154.5
Hillsdale	5,065	2	39.5	5,170	4	77.4
Holland	10,998	6	54.6	9,930	7	70.5
Houghton	5,369	1	18.6	5,016	4	79.7
Iron Mountain	9,426	8	84.9	8,448	7	82.9
Ironwood	13,755	8	58.2	10,925	8	73.2
Ishpeming	12,723	8	62.9	11,082	15	135.4
Jackson	33,477	34	101.6	27,017	27	99.9
Kalamazoo	42,655	60	140.7	34,918	45	128.9
Lansing	34,880	26	74.5	25,020	18	71.9
Laurium	8,831	5	56.6	8,836	7	79.2
Ludington	9,756	6	61.5	7,810	8	102.4
Manistee	12,272	4	32.6	11,892	11	92.5
Marquette	11,782	18	152.8	11,177	12	107.4
Menominee	10,311	11	106.7	10,130	14	138.2
Monroe	7,148	7	97.9	6,844	8	116.9
Mt. Clemens	7,907	10	126.5	7,520	11	146.3
Muskegon	25,117	26	103.5	21,792	30	137.7
Negaunee	9,014	5	55.5	7,183	5	69.6
Niles	5,328	4	75.1	4,947	3	60.6
Owosso	9,804	7	71.4	9,489	7	73.8
Pontiac	15,748	18	114.3	12,395	20	161.4
Port Huron	18,475	13	70.4	20,121	22	109.3
Saginaw	51,810	46	88.8	49,686	52	104.7
St. Joseph	6,141	3	48.9	5,567	4	71.9
Sault Ste. Marie	13,006	9	69.2	12,184	14	114.9
Three Rivers	5,458	7	128.3	4,397	6	136.5
Traverse City	12,408	9	72.5	12,377	10	80.8
Wyandotte	9,241	4	43.3	6,314	11	174.2
Ypsilanti	5,778	5	86.5	7,318	5	68.3

*Estimated for intercensal years.

SEASONAL PREVALENCE OF PNEUMONIA.

By Table 4 it is evident that this disease is a cold weather one, the greatest number of deaths taking place in February and March and the least number in July and August. To illustrate this table the following Plate is inserted. That a relationship between the prevalence of pneumonia and velocity of the wind exists is shown by the plate entitled "Pneumonia and Wind Velocity."

TABLE 4.—*The seasonal prevalence of pneumonia, in Michigan, as indicated by the average number of persons taken sick in each month in the nine years, 1904–1912, and by the average number of deaths from this disease, in each month in the fifteen years, 1898–1912.*

Years.		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904-1912.	Average number of persons taken sick in each month*.....	441	454	410	334	261	113	65	57	89	138	203	286
1898-1912.	Average number of deaths in each month†	349	389	386	319	239	123	69	60	78	121	179	262

*The months in which some of the cases were taken sick were not reported.
†The averages for the years 1898–1912, are compiled from the Secretary of State's Vital Statistics of Michigan.

DIAGRAM SHOWING THE AVERAGE NUMBER OF DEATHS FROM PNEUMONIA, OCCURRING IN EACH MONTH AND THE AVERAGE MONTHLY TEMPERATURE, DURING THE YEARS, 1898–1912, INCLUSIVE.

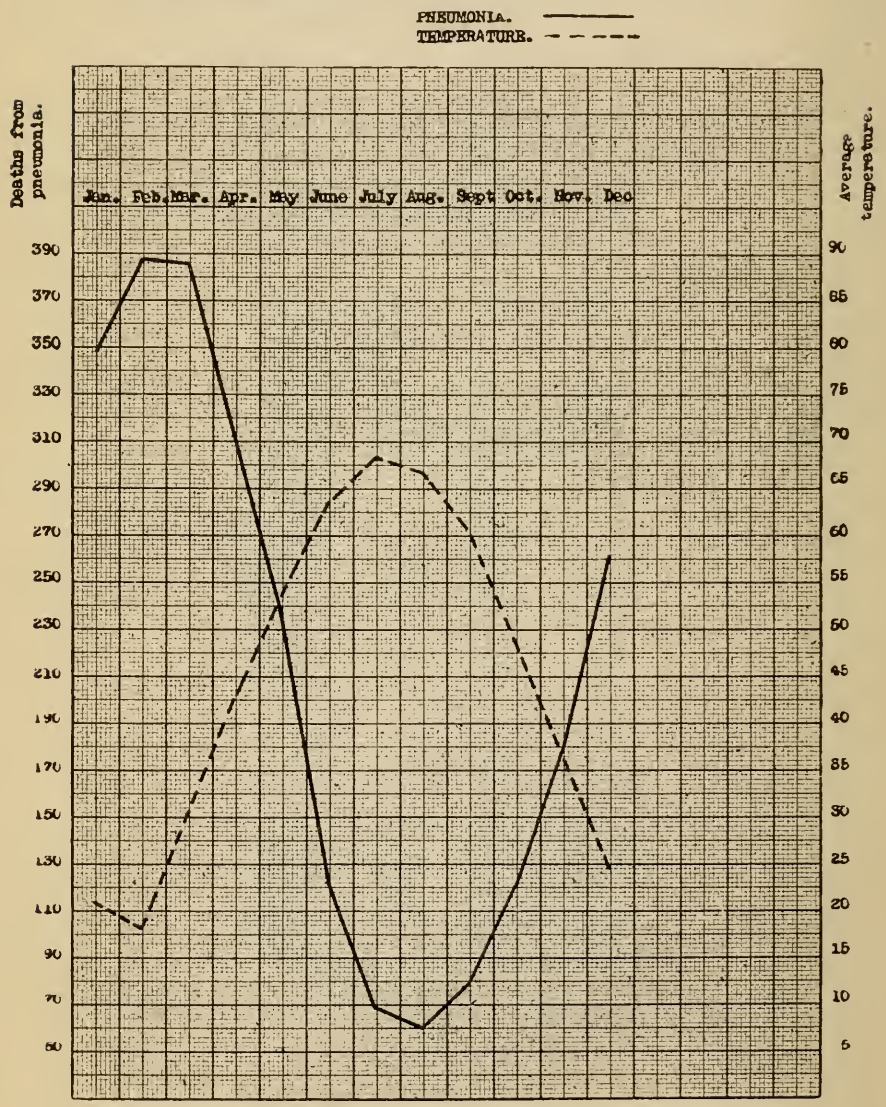


DIAGRAM SHOWING THE AVERAGE NUMBER OF MONTHLY DEATHS FROM PNEUMONIA AND THE AVERAGE MONTHLY WIND VELOCITY, FOR THE YEARS, 1898-1912, INCLUSIVE.

INFLUENCE OF AGE AND SEX IN PNEUMONIA.

That age and sex also have a great influence on the fatality rate of pneumonia is borne out by the following three tables, i. e., Tables 5, 5A and 5B.

Table 5 deals with the study by showing the proportion of the deaths or recoveries of males or females at given ages to the total deaths and recoveries from this disease, and covers the period of nine years, 1904-1912.

By this table it shows that of those who died from pneumonia, 37 per cent were under 5 years of age; 9 per cent between 5 and 25 years of age; 16 per cent between 25 and 50 years; 25 per cent between 50 and 75 years, and 12 per cent were 75 years of age and over.

Thirty-seven per cent of both the males and females who died, and 18 per cent of the males and 20 per cent of the females who recovered were under 5 years of age.

Ten per cent of the males and 14 per cent of the females who died and 2 per cent of the males and 4 per cent of the females who recovered were over 74 years of age.

Table 5A takes up the study of age and sex in fatal cases of pneumonia by showing deaths per each 100,000 living at the same age and sex, also the ratio of the death rates (not deaths) of males to that of females, thereby showing among which of the two sexes this disease takes its greatest tribute in proportion to the number living.

At the beginning of the year 1912, there were estimated to be living in this State 32,154 males whose ages were under one year, and 31,402 females of the same age. During the year above-mentioned, there occurred 400 deaths from pneumonia among males under one year of age and 282 deaths among the females. Thus, it will be seen that the deaths among the males would be at the rate of 1,244.0 and of the females 898.0 per 100,000 of each sex living at that age, while the ratio of the death rate of the males to that of the females would be 139, or in other words, if the populations of the two sexes at that age had been identical, then to every one hundred deaths that occurred among the females there would have been 139 among the males.

It will also be seen by this table that the death rate diminishes with the advancement of age until the 15th year is reached, when there becomes an increase in the rates with the advancement of age, but the rate for the State at all ages is not equaled until the 55th year is reached, and at 80 years and over the rate for both sexes almost equals that of the females under one year of age.

While it is well known by this Department that all non-fatal cases of pneumonia are not reported to this office, and owing to that fact, it would be fallacious to compare the fatality rate (deaths per 100 cases) of this State with that of another state, still, if we may assume that, of the non-fatal cases of this disease that were reported to this Department, the same proportionate number of those of each sex and age were

reported, then it would not be fallacious to compare the fatality rate of the sexes, nor the fatality rate of one age group with that of another. In Table 5A, is shown the deaths per 100 cases by age groups and sex.

It will be seen by the above-mentioned table that, of those who are under one year of age, out of every 100 persons taken sick with pneumonia, 94.9 of them die, and that the fatality rate decreases with the advancement of age until the 15th year is reached, when the rate decreases with the advancement of age, which was also true of the death rates.

TABLE 5.—*The influence of age and sex in pneumonia, as indicated by those of known ages, who died or recovered from this disease, in the nine years, 1904–1912. Arranged by sex, in age periods of one year for those of from one to five years; in five year periods for those of from five to seventy-five years, and in one group for those of seventy-five years and over.*

Age groups.	Died.						Recovered.					
	Total deaths.			Per cent of all deaths.			Total recoveries.			Per cent of recoveries.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 1 year	3,441	2,511	5,952	13.79	10.07	23.86	141	94	235	2.47	1.65	4.12
1 year	1,067	948	2,015	4.27	3.81	8.08	113	110	223	1.98	1.93	3.91
2 years	362	334	696	1.45	1.34	2.79	121	108	229	2.12	1.89	4.01
3 years	214	189	403	.86	.76	1.62	118	97	215	2.07	1.70	3.77
4 years	120	128	248	.48	.51	.99	103	77	180	1.81	1.35	3.16
Under 5 years	5,204	4,110	9,314	20.86	16.47	37.33	596	486	1,082	10.45	8.52	18.97
5 to 9 years	325	303	628	1.30	1.22	2.52	450	354	804	7.89	6.21	14.10
10 to 14 years	161	188	349	.65	.75	1.40	282	204	486	4.94	3.58	8.52
15 to 19 years	345	234	579	1.38	.94	2.32	363	160	523	6.36	2.81	9.17
20 to 24 years	407	290	697	1.63	1.16	2.79	270	112	382	4.73	1.96	6.69
25 to 29 years	392	282	674	1.57	1.13	2.70	190	100	290	3.33	1.75	5.08
30 to 34 years	431	306	737	1.73	1.23	2.96	154	121	275	2.70	2.12	4.82
35 to 39 years	502	327	829	2.01	1.31	3.32	157	107	264	2.75	1.88	4.63
40 to 44 years	552	302	854	2.21	1.21	3.42	144	101	245	2.53	1.77	4.30
45 to 49 years	631	345	976	2.53	1.38	3.91	141	128	269	2.47	2.24	4.71
50 to 54 years	617	353	970	2.47	1.42	3.89	135	92	227	2.37	1.61	3.98
55 to 59 years	645	436	1,081	2.58	1.75	4.33	90	98	188	1.58	1.72	3.30
60 to 64 years	704	580	1,284	2.82	2.33	5.15	95	91	186	1.67	1.59	3.26
65 to 69 years	783	689	1,472	3.14	2.76	5.90	77	97	174	1.35	1.70	3.05
70 to 74 years	765	761	1,526	3.07	3.05	6.12	67	78	145	1.17	1.37	2.54
75 years and over	1,405	1,573	2,978	5.63	6.31	11.94	71	93	164	1.25	1.63	2.88
All ages	13,869	11,079	24,948	55.58	44.42	100.00	3,282	2,422	5,704	57.54	42.46	100.00

TABLE 5A.—*The influence of age and sex in fatal cases of pneumonia, in Michigan in 1912 as indicated by the death rates per 100,000 population of the same age and sex.*

Age groups.	Deaths from pneumonia in 1912.			Death rates per 100,000 population of same age and sex.			Ratio of death rates of males to death rates of females.
	Total.	Males.	Females.	Total.	Males.	Females.	
All known ages	2,856	1,670	1,186	98.5	111.0	85.0	131
Under 1 year	682	400	282	1073.1	1244.0	898.0	139
1 year	277	150	127	468.7	503.4	433.4	116
2 years	85	45	40	134.9	140.0	129.6	108
3 years	46	31	15	73.6	97.7	48.8	200
4 years	22	10	12	35.8	32.3	39.4	82
Under 5 years	1,112	636	476	359.2	408.3	311.6	131
5 to 9 years	70	38	32	25.2	27.0	23.3	111
10 to 14 years	37	20	17	14.4	15.5	13.4	116
15 to 19 years	61	42	19	22.3	30.1	14.2	212
20 to 24 years	78	48	30	28.3	33.5	22.6	104
25 to 29 years	78	52	26	31.0	39.1	22.0	178
30 to 34 years	86	57	29	39.0	49.4	27.6	179
35 to 39 years	94	63	31	47.4	60.6	32.8	184
40 to 44 years	101	60	41	57.4	65.0	49.0	133
45 to 49 years	118	74	44	75.0	89.0	59.2	150
50 to 54 years	116	85	31	80.8	110.7	46.4	239
55 to 59 years	109	76	33	101.0	130.1	66.7	195
60 to 64 years	126	79	47	146.0	172.9	115.8	149
65 to 69 years	173	99	74	245.4	265.7	222.6	119
70 to 74 years	159	79	80	348.8	333.0	366.0	91
75 to 79 years	160	74	86	556.4	496.8	620.4	80
80 years and over	178	88	90	888.2	877.4	899.0	98

TABLE 5B.—*The influence of age and sex in pneumonia, as indicated by the number of deaths per 100 reported cases, by age groups and sex, in Michigan, in 1912.*

Age groups.	Total.			Males.			Females.		
	Reported cases.	Deaths.	Deaths per 100 cases.	Reported cases.	Deaths.	Deaths per 100 cases.	Reported cases.	Deaths.	Deaths per 100 cases.
Under 1 year	719	682	94.9	427	400	93.7	292	282	96.6
1 year	301	277	92.0	163	150	92.0	138	127	92.0
2 years	110	85	77.3	56	45	80.4	54	40	74.1
3 years	74	46	62.2	47	31	66.0	27	15	55.6
4 years	45	22	48.9	20	10	50.0	25	12	48.0
Under 5 years	1,249	1,112	89.0	713	636	89.2	536	476	88.8
5 to 9 years	145	70	48.3	72	38	52.8	73	32	43.8
10 to 14 years	89	37	41.6	51	20	39.2	38	17	44.7
15 to 19 years	110	61	55.5	79	42	53.2	31	19	61.3
20 to 24 years	134	78	58.2	92	48	52.2	42	30	71.4
25 to 29 years	112	78	69.6	79	52	65.8	33	26	78.8
30 to 34 years	127	86	67.7	77	57	74.0	50	29	58.0
35 to 39 years	124	94	75.8	83	63	75.9	41	31	75.6
40 to 44 years	125	101	80.8	74	60	81.1	51	41	80.4
45 to 49 years	144	118	81.9	85	74	87.1	59	44	74.6
50 to 54 years	137	116	84.7	98	85	89.0	39	31	79.5
55 to 59 years	141	109	77.3	91	76	83.5	50	33	66.0
60 to 64 years	144	126	87.5	91	79	86.8	53	47	88.7
65 to 69 years	201	173	86.1	113	99	87.6	88	74	84.1
70 to 74 years	172	159	92.4	84	79	94.0	88	80	90.9
75 to 79 years	181	160	88.4	87	74	85.1	94	86	91.5
80 years and over	188	178	94.7	93	88	94.6	95	90	94.7
All known ages	3,523	2,856	81.1	2,062	1,670	81.0	1,461	1,186	81.2

PREDISPOSING INFLUENCES IN PNEUMONIA.

In Table 6 is shown the diseases or other predisposing influences that might have rendered the persons, suffering from pneumonia, susceptible to the contraction of the disease. As noted on a preceding page, pneumonia is a cold weather disease, which fact is greatly supported by a study of Table 6. As will be seen, colds head the list as a predisposing cause, followed by influenza, and bronchitis, all of which are cold weather complaints.

TABLE 6.—*Predisposing influences in pneumonia, as indicated by the manner in which the disease was reported to have begun, in some of the cases, in the nine years, 1904–1912.*

Disease began as or followed.	Number of instances.	Disease began as or followed.	Number of instances.
Cold	3,531	Sepsis	15
Influenza	1,328	Throat trouble	14
Bronchitis	682	Mitral insufficiency	14
Exposure to inclement weather	486	Arteriosclerosis	11
Senility	419	Rickets	11
Heart disease	404	Diphtheria	11
Measles	343	Cancer	11
Whooping-cough	232	Cholera infantum	9
Kidney trouble	173	Chicken-pox	9
Asthma	164	Dropsy	9
Alcoholism	136	Spinal trouble	8
Pleurisy	127	Scarlet fever	8
Bowel trouble	108	Epilepsy	7
General debility	106	Malarial fever	7
Confinement	98	Mumps	7
Meningitis	83	Teething	6
Stomach trouble	78	Otitis media	6
Traumatism	75	Eclampsia	6
Rheumatism	70	Syphilis	6
Tuberculosis	68	Pyemia	4
Paralysis	58	Strangulation of hernia	4
Convulsions	39	Uremia	4
Liver trouble	39	Hiccough	3
Insanity	36	Eczema	3
Tonsilitis	35	Puerperal fever	3
Mal-nutrition	33	Gangrene	3
Typhoid fever	32	Catarrhal fever	2
Abscess	28	Eye trouble	2
Operation	27	Goitre	2
Lung trouble	26	Adenoids	1
Apoplexy	25	Anesthesia	1
Marasmus	24	Change of life	1
Croup	22	Thrush	1
Diabetes	22	Carbuncle	1
Miscarriage	20	Sunstroke	1
Appendicitis	20	Palsy	1
Peritonitis	19	Poliomyelitis	1
Brain trouble	18	Gonorrhoea	1
Anaemia	18		
Erysipelas	17		

RESTRICTIVE AND PREVENTIVE MEASURES.

As previously stated, a large per cent of the non-fatal cases of pneumonia do not come to the attention of either the local or State health authorities, therefore making it impossible for the local health authorities to enforce the restrictive and preventive measures as recommended by this Department, relative to croupous or lobar pneumonia.

This is a deplorable fact, because there is now no question as to the communicability of this disease, and those non-fatal cases that are not reported to the local health authorities might be the cause of other cases, or even deaths from this disease, occurring in a community, by reason of the restrictive and preventive measures not being enforced.

Table 7 shows that, of those cases that are reported to the local health authorities, a larger per cent had been placed under restriction in 1912 than in the past years.

TABLE 7.—*Restrictive and preventive measures in pneumonia, in Michigan, in 1912, and the average for the years, 1904–1911, inclusive.*

Restrictive and preventive measures.	1912.		Average, 1904–1911.	
	Cases.	Per cent.	Cases.	Per cent.
Isolation:				
Enforced	2,419	67	1,288	37
Neglected	325	9	675	19
Not stated or statements doubtful	848	24	1,514	44
Disinfection of sputa:				
Enforced	2,549	*72	1,554	*46
Neglected	145	* 4	282	* 8
Not stated or statements doubtful	845	*24	1,561	*46
Disinfection of Bedding, Clothing, etc., soiled by sputa:				
Enforced	2,641	*75	1,968	*58
Neglected	72	* 2	270	* 8
Not stated or statements doubtful	826	*23	1,159	*34
Disinfection of rooms occupied by patients:				
Enforced	2,690	74	1.957	56
Neglected	92	3	411	12
Not stated or statements doubtful	810	23	1,109	32

*During the years, 1904–1911, there were on the average of 81 instances per year in which there was said to be no sputa and in 1912, 53 instances, therefore these numbers have been deducted from the total number of cases before making the per cents.

TUBERCULOSIS, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

At the beginning of the year 1912, there were reported to be in existence, in the State, 2,544 living cases of tuberculosis. At the close of the year 1912 there were on the record 2,478 cases that were still sick. During the year 1912, there occurred 2,744 deaths from this disease; or which is equivalent to a death rate of 94.5 per 100,000 population.

That but a small percentage of the non-fatal cases are reported to this Department by attending physicians, as required by law, is very apparent. Dr. Philip, of Edinburgh, states, in this connection, that "after a careful study of the subject, the ascertained mortality can safely be multiplied by ten in order to represent approximately the number of persons living already seriously afflicted, and even twice that figure would still be below the mark." So, based on the above quotation, there are approximately 27,500 cases of seriously affected tuberculous persons in this State, or about ten times the number actually recorded.

If the physicians would co-operate with the State Board of Health by reporting all such cases, they would not only render this Department a great favor by the enhancement of its statistics, but with the knowledge of those cases still sick, circulars and other valuable pamphlets would be sent them by this Department, teaching the sick how to so

conduct their habits as to prevent those coming in contact with them from contracting the disease.

GENERAL PREVALENCE OF TUBERCULOSIS.

Table 8, showing the general prevalence of this disease, in Michigan, is begun with the year 1898, that being the year in which the law providing for the compulsory reporting of all deaths took effect previous to that year, it is believed, not all deaths being reported.

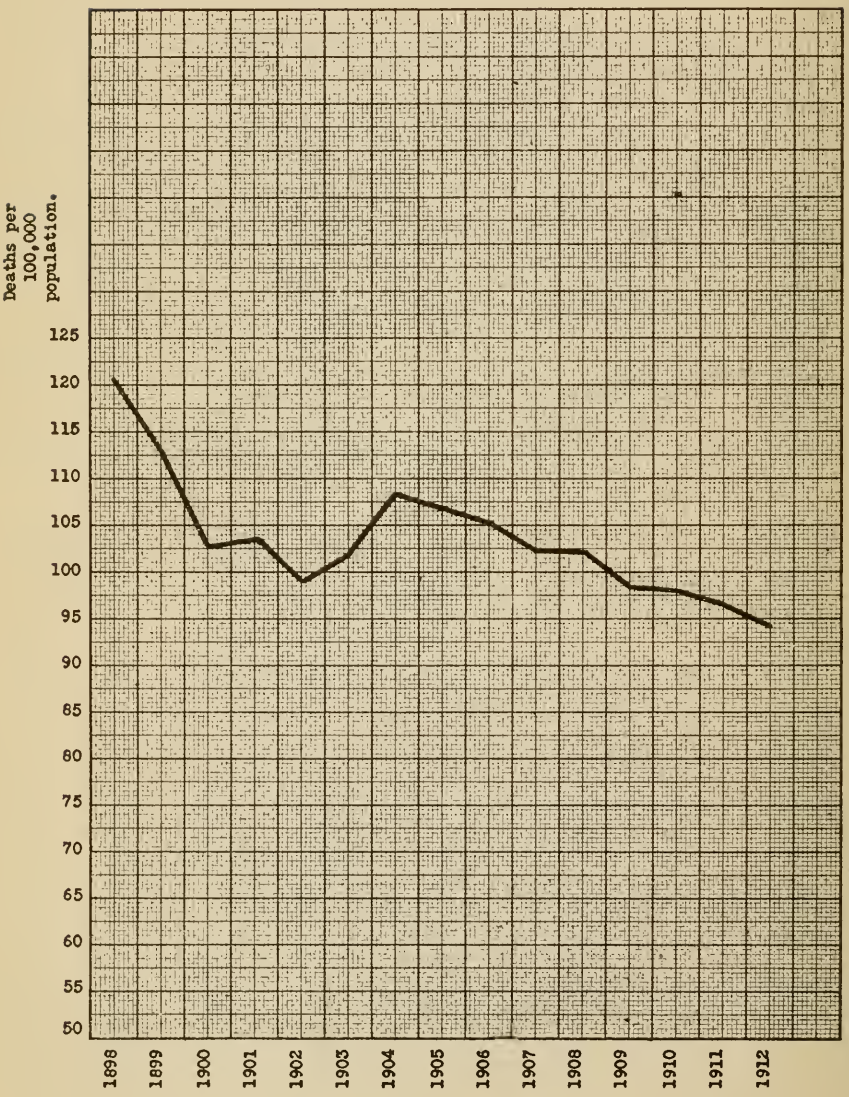
By referring to the figures representing the average death rates for the three five-year periods, it will be seen that for the years 1903-1907, the average death rate from pulmonary tuberculosis was 2.5 per cent higher than the average rate for the previous five years, while, comparing the death rates of the same periods, other forms of tuberculosis showed a decrease of 29.3 per cent. By comparing the average death rate for the five years ending with 1912 with the former five-year period, it shows that pulmonary tuberculosis decreased 8.3 per cent, while the rate for other forms of tuberculosis remained practically stationary.

The diagram following, and illustrating Table 8, shows the downward tendency of the death rates from this disease, in Michigan:

TABLE 8.—*The prevalence of tuberculosis of the lungs and other forms of tuberculosis, in Michigan, in each of the fifteen years, 1898–1912.*

Years.	Pulmonary tuberculosis.		Other forms of tuberculosis.	
	Deaths.	Deaths per 100,000 population.	Deaths.	Deaths per 100,000 population.
1898	2,153	91.6	673	28.6
1899	2,098	87.9	596	25.0
1900	2,018	83.4	460	19.0
1901	2,152	87.8	380	15.5
1902	2,088	84.3	357	14.4
Average, 1898–1902	2,102	86.9	493	22.9
1903	2,155	86.1	393	15.7
1904	2,306	91.1	441	17.4
1905	2,288	89.5	437	17.1
1906	2,303	89.1	422	16.3
1907	2,338	89.5	383	14.7
Average, 1903–1907	2,278	89.1	415	16.2
1908	2,249	85.2	451	17.1
1909	2,237	83.9	387	14.5
1910	2,273	80.9	483	17.2
1911	2,284	79.9	482	16.9
1912	2,289	78.8	455	15.7
Average, 1908–1912	2,266	81.7	452	16.3

DIAGRAM SHOWING THE DEATHS PER 100,000 POPULATION FROM TUBERCULOSIS (ALL FORMS), IN MICHIGAN, FOR EACH OF THE YEARS, 1898-1912.



THE PREVALENCE OF TUBERCULOSIS IN MICHIGAN COMPARED WITH OTHER STATES OF THE REGISTRATION AREA.

The following table shows the death rates from pulmonary tuberculosis in each of the States of the Registration Area of the United States. This data covers the year 1911, it being the latest available. This table has a two-fold value. First, enabling one to compare Michigan's death rate with that of other States; second, showing the influence of color in tuberculosis:

TABLE 9.—*Showing the death rates per 100,000 population from pulmonary tuberculosis by color of decedents.*

Registration States.	Deaths per 100,000 population.	Registration States.	Deaths pe 100,000 population.
Registration States (total)	134.7	Montana (total)	91.3
White	125.1	White	69.1
Colored	409.8	Colored	607.4
California (total)	180.8	New Hampshire (total)	104.6
White	173.5	White	104.3
Colored	321.6	Colored	299.9
Colorado (total)	202.7	New Jersey (total)	151.4
White	197.1	White	144.0
Colored	484.5	Colored	349.4
Connecticut (total)	127.7	New York (total)	154.9
White	123.9	White	149.1
Colored	395.5	Colored	515.0
Indiana (total)	131.4	North Carolina (total)	229.5
White	125.2	White	163.3
Colored	397.7	Colored	351.2
Kentucky (total)	200.4	Ohio (total)	127.4
White	170.6	White	119.3
Colored	432.2	Colored	462.4
Maine (total)	116.5	Pennsylvania (total)	117.9
White	116.8	White	111.0
Colored	42.1	Colored	377.4
Maryland (total)	178.8	Rhode Island (total)	145.1
White	132.4	White	138.4
Colored	391.2	Colored	500.0
Massachusetts (total)	129.3	Utah (total)	37.9
White	126.6	White	36.0
Colored	346.3	Colored	143.6
Michigan (total)	81.2	Vermont (total)	97.1
White	78.2	White	96.4
Colored	416.9	Colored	240.2
Minnesota (total)	100.4	Washington, D. C. (total)	84.3
White	96.8	White	75.9
Colored	540.8	Colored	368.3
Missouri (total)	137.2	Wisconsin (total)	88.0
White	120.6	White	87.2
Colored	465.8	Colored	230.5

The above table places Michigan in a very favorable position, from this standpoint, as compared with the other States, Utah being the only State having a lower death rate.

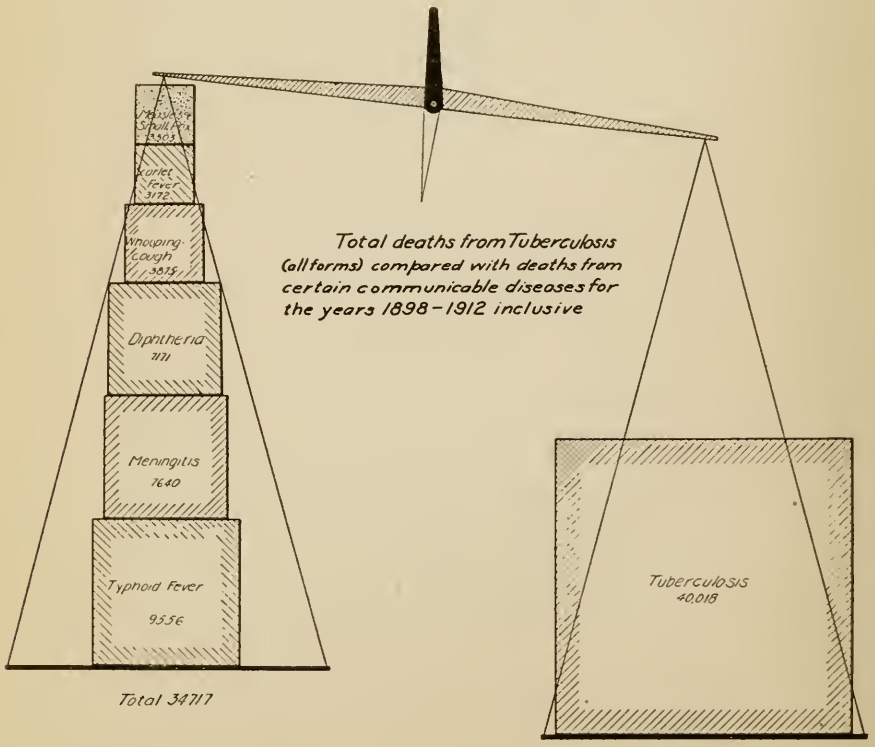
While the death rate for this disease is low in Michigan, still some of the States having a higher death rate are deserving of more credit than this State in combating this disease, for the reason that their death rates

show a greater per cent of decrease during the same period under comparison. For example, in New York State, where the crusade against tuberculosis has been carried on for a great number of years, their average death rate from pulmonary tuberculosis for the five years, 1903-1907, showed a decrease of 4.9 per cent over the former five-year period, while in Michigan during the same period there was an increase of 2.5 per cent. In New York, during the four years ending with 1911, the average rate for the four years showed a decrease of 26.7 per cent, compared with the former five-year period, while in this State the decrease was only 8 per cent.

If the death rates of this State had decreased in the same proportion as the rates in New York, then Michigan's rate for the four years ending with 1911 would have been 64.8 instead of 82.3.

DEATHS FROM TUBERCULOSIS, COMPARED WITH THOSE OF OTHER COMMUNICABLE DISEASES.

As will be seen by the following diagram tuberculosis, for the years 1898-1912, caused more deaths than all other communicable diseases combined, excepting pneumonia.



For the purpose of determining whether, in this State, any county or group of counties might be exceptionally susceptible to this disease by reason of climatic conditions, the State has been divided into eleven geographical divisions, the counties in each of which being thought to be somewhat similar in this respect.

By Table 10 may be seen those districts that showed a higher average death rate for the years 1904-1912 from this disease than for the State as a whole (95.3): Southeastern (119.3), Northwestern (105.6), Upper Peninsular (100.9) and Western (99.5).

The counties showing a much higher (25 per cent or more) average rate than the State, are: Grand Traverse, Luce, Mackinac and Wayne.

TABLE 10.—*The geographical distribution of tuberculosis, in Michigan, in the nine years, 1904–1912, as indicated by the average number of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION	283,436	400	286	100.9
Alger county	6,672	5	4	60.0
Baraga county	5,471	5	5	91.4
Chippewa county	22,327	25	21	94.1
Delta county	27,568	37	29	105.2
Dickinson county	18,941	24	17	89.8
Gogebic county	18,461	20	17	92.1
Houghton county	72,940	131	84	115.2
Iron county	10,261	10	7	68.2
Keweenaw county	5,000	14	5	100.0
Luce county	3,765	7	6	159.4
Mackinac county	8,303	12	11	132.5
Marquette county	41,500	68	47	113.3
Menominee county	26,043	23	21	80.7
Ontonagon county	7,486	10	6	80.2
Schoolcraft county	8,698	9	6	69.0
NORTHWESTERN DIVISION	91,828	136	97	105.6
Benzie county	10,907	13	11	100.9
Grand Traverse county	23,431	54	33	140.8
Leelanau county	10,843	14	12	110.7
Manistee county	27,144	36	27	99.5
Wexford county	19,503	19	14	71.8
NORTHERN DIVISION	85,272	85	69	80.9
Antrim county	15,459	14	12	77.6
Charlevoix county	16,650	19	15	90.1
Cheboygan county	17,385	16	13	74.8
Crawford county	3,754	3	2	53.3
Emmet county	17,533	22	17	97.0
Kalkaska county	7,571	7	6	79.2
Otsego county	6,920	4	4	57.8
NORTHEASTERN DIVISION	60,719	48	44	72.5
Alcona county	5,653	5	5	88.4
Alpena county	19,973	17	17	85.1
Iosco county	10,188	9	8	78.5
Montmorency county	3,594	3	3	83.5
Ogemaw county	8,728	6	5	57.3
Oscoda county	1,930	2	1	51.8
Presque Isle county	10,653	6	5	46.9

*Estimated for intercensal years.
†From many localities the fatal cases only were reported.

TABLE 10.—*Concluded.*

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
WESTERN DIVISION	286,444	395	285	99.5
Kent county	143,635	236	156	108.6
Lake county	5,017	6	5	99.7
Mason county	20,335	23	20	98.4
Muskegon county	37,739	48	38	100.7
Newaygo county	18,561	15	13	70.0
Oceana county	17,880	17	15	83.9
Ottawa county	43,277	50	38	87.8
NORTHERN CENTRAL DIVISION	107,010	97	80	74.8
Clare county	9,171	7	6	65.4
Gladwin county	8,337	6	5	60.0
Isabella county	24,008	25	20	83.3
Mecosta county	20,224	20	17	84.1
Midland county	14,700	13	12	81.6
Missaukee county	10,270	7	5	48.7
Osceola county	18,513	17	13	70.2
Roscommon county	1,787	2	2	111.9
BAY AND EASTERN DIVISION	348,688	332	284	81.4
Arenac county	9,844	7	5	50.8
Bay county	65,103	66	58	89.1
Huron county	35,165	31	27	76.8
Lapeer county	26,957	28	21	77.9
Saginaw county	86,312	86	74	85.7
Sanilac county	34,713	31	27	77.8
St. Clair county	54,792	50	43	78.5
Tuscola county	35,802	33	29	81.0
CENTRAL DIVISION	322,202	382	272	84.4
Barry county	22,337	20	15	67.2
Clinton county	24,832	23	19	76.5
Eaton county	30,911	36	29	93.8
Genesee county	47,794	52	42	87.9
Gratiot county	29,971	32	27	90.1
Ingham county	45,968	49	33	71.8
Ionia county	34,729	44	32	92.1
Livingston county	18,527	57	18	97.2
Montcalm county	33,372	32	28	83.9
Shiawassee county	33,761	37	29	85.9
SOUTHWESTERN DIVISION	144,310	173	132	91.5
Allegan county	39,229	43	34	86.7
Berrien county	50,548	72	50	98.9
Cass county	20,285	23	19	93.7
Van Buren county	34,248	35	29	84.7
SOUTHERN CENTRAL DIVISION	329,210	436	303	92.0
Branch county	25,982	31	22	84.7
Calhoun county	53,988	59	48	88.9
Hillsdale county	29,796	30	25	83.9
Jackson county	48,649	52	43	88.4
Kalamazoo county	52,095	101	56	107.5
Lenawee county	48,817	50	40	81.9
St. Joseph county	23,911	27	22	92.0
Washtenaw county	45,972	86	47	102.2
SOUTHEASTERN DIVISION	529,077	777	631	119.3
Macomb county	32,962	39	34	103.1
Monroe county	33,095	36	31	93.7
Oakland county	46,525	63	45	96.7
Wayne county	416,495	639	521	125.1

*Estimated for intercensal years.
†From many localities the fatal cases only were reported.

THE PREVALENCE OF TUBERCULOSIS IN URBAN AND RURAL LOCALITIES.

In order to learn what effect, if any, the density of population has upon the prevalence of this disease, (prevalence based on the deaths per 100,000 population) the State has been divided into urban and rural localities, and the urban localities again subdivided by grouping the cities and villages having certain populations.

By Table 11 it will be seen that density of population is a factor in the prevalence of this disease. In the urban localities beginning with the group of cities of 50,000 inhabitants and over, the average rates gradually decrease with the decrease in the populations with the single exception of that group whose populations range from 10,000 to 25,000. This exception is explained by reason of the fact that certain cities having exceptionally high rates, due to causes foreign to those cities, are included in this group. For instance, Ann Arbor, where the U. of M. Hospital is located, many persons being treated there for tuberculosis who are non-residents of that city; and those cities, Pontiac and Traverse City, where are located the Hospitals for the Insane, the death rates for the inmates of these institutions being extraordinarily high, as may be seen by reference to the footnotes of Table 11A.

By the same Table it may be seen that, while the death rates from this disease are higher in the urban than in the rural localities, still the death rates in the urban localities showed a greater decrease in 1912, compared with their average rate, than did the rural localities by the same comparison. The death rate in the urban localities decreased 6.3 per cent, while that of the rural localities remained stationary. The decrease in the death rate in the urban localities is due, undoubtedly, to two reasons: First, the work of those engaged in combating tuberculosis has been confined mostly to the cities; and second, that nearly all of the tuberculosis sanatoria, maintained by individual counties, as well as the one maintained by the State, are located in townships, and the deaths from tuberculosis occuring in those sanatoria, whether residents or non-residents of the township in which those deaths occurred, are credited to that township, thereby raising the death rate of that township, as well as the rate for the entire rural population, and proportionately lowering the rate of the urban localities. But admitting the fact that the rural localities are credited with deaths that should be credited to the urban localities, still, the average death rate from this disease, in the rural localities is 26 per cent lower than the rate of the urban.

By Table 11A may be seen the individual death rates of those cities comprising the first four groups of Table 11. This Table also serves to compare the death rate in one locality with that of another, also to determine whether the disease is increasing or decreasing in any of those cities by comparing the death rate of the current year with that of the average.

The cities in Table 11A, that showed much higher (25 per cent or higher) rates, in 1912, than the rate for the State (94.5) for that year, were: Alpena, Ann Arbor, Benton Harbor, Cadillac, Coldwater, Dowagiac, Iron Mountain, Kalamazoo, Manistee, Mt. Clemens, Negaunee, Pontiac and Traverse City.

TABLE 11.—*The prevalence of tuberculosis (all forms) in urban and rural localities, in Michigan, as indicated by the death rates per 100,000 population in the several groups, for each of the years, 1904–1912.*

Localities—Grouped according to density of population.	Deaths per 100,000 population.									
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Average 1904–1911.	1912.
Cities over 50,000	133.6	110.6	116.6	122.5	113.7	112.3	114.8	113.9	116.7	110.5
Cities from 25,000 to 50,000	126.8	112.6	108.7	103.6	105.5	88.0	92.4	91.5	102.0	96.7
Cities from 10,000 to 25,000 and Calumet township	101.5	116.5	115.2	119.5	132.9	120.6	121.5	121.0	118.2	118.6
Cities and villages from 5,000 to 10,000	100.1	117.8	101.8	98.3	110.7	105.9	112.1	93.6	105.1	94.9
Cities and villages under 5,000	97.4	104.0	104.1	102.8	98.5	86.7	87.2	86.9	94.6	82.3
Total urban	112.4	110.9	110.5	111.8	109.4	103.9	105.8	103.3	108.3	101.4
Rural localities (townships)*	84.6	80.2	81.3	77.0	78.7	79.0	80.7	78.5	80.0	80.0

*Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 11A.—*The deaths from tuberculosis in 1912, and preceding years, in each of the principal localities included in the first four groups in Table 11.*

Localities.	1912.			Average, 1904–1911.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	10,791	9	83.4	11,184	9	80.5
Albion	6,130	5	81.6	5,383	4	74.3
Alpena	12,808	19	148.3	12,763	12	94.0
Ann Arbor	14,890	22	†147.8	14,699	21	142.9
Battle Creek	26,285	24	91.3	24,751	25	101.0
Bay City	46,674	50	107.1	41,817	36	86.1
Benton Harbor	10,013	14	139.8	7,440	11	147.8
Boyne City	6,140	3	48.9	3,924	4	101.9
Cadillac	8,869	11	124.0	7,714	6	77.8
Calumet Township	21,079	23	109.1	18,548	24	129.4
Cheboygan	6,902	4	58.0	6,878	5	72.7
Coldwater	5,852	7	119.6	6,154	5	81.2
Detroit	515,158	582	113.0	376,881	452	119.9
Dowagiac	5,316	8	150.5	4,707	5	106.2
Escanaba	13,893	14	100.8	12,392	18	145.3
Flint	46,439	32	68.9	22,129	21	94.9
Grand Haven	6,062	2	33.0	5,639	6	106.4
Grand Rapids	118,189	115	97.3	104,104	111	106.6
Hancock	9,962	11	110.4	7,768	12	154.5
Hillsdale	5,065	3	59.2	5,170	5	96.7
Holland	10,998	9	81.8	9,930	10	100.7
Houghton	5,369	1	18.6	5,016	4	79.7
Iron Mountain	9,426	14	148.5	8,448	9	106.5
Ironwood	13,775	9	65.4	10,925	10	91.5
Ishpeming	12,723	11	86.5	11,082	14	126.3
Jackson	33,477	25	74.7	27,017	30	111.0
Kalamazoo	42,655	56	‡131.3	34,918	47	134.6
Lansing	34,880	31	88.9	25,020	17	67.9
Laurium	8,831	9	101.9	8,836	8	90.5
Ludington	9,756	11	112.8	7,810	5	64.0
Manistee	12,272	17	138.5	11,892	16	134.5
Marquette	11,782	12	101.9	11,177	16	143.2
Menominee	10,311	10	97.0	10,130	10	98.7
Monroe	7,148	5	69.9	6,844	7	102.3
Mt. Clemens	7,907	11	139.1	7,520	10	133.0
Muskegon	25,117	29	115.5	21,792	26	119.3
Negaunee	9,014	15	166.4	7,183	7	97.5
Niles	5,328	4	75.1	4,947	7	141.5
Owosso	9,804	9	91.8	9,489	10	105.4
Pontiac	15,748	29	§184.2	12,395	20	161.4
Port Huron	18,475	16	86.6	20,121	15	74.5
Saginaw	51,810	60	115.8	49,686	50	100.6
St. Joseph	6,141	4	65.1	5,567	5	89.8
Sault Ste. Marie	13,006	14	107.6	12,184	15	123.1
Three Rivers	5,458	0	.....	4,397	3	68.2
Traverse City	12,408	27	‖217.6	12,377	30	242.4
Wyandotte	9,241	10	108.2	6,314	11	174.2
Ypsilanti	5,778	2	34.6	7,318	9	123.0

*Estimates for intercensal years.

†High death rate undoubtedly due to non-resident persons dying at the U. of M. hospital.

‡Excluding the deaths from tuberculosis occurring in the asylum, the death rate for this disease for the city is only 96.0, while the death rate in the asylum is 844.4 per 100,000 inmates.

§The death rate for the city is 104.5 and for the asylum 999.2.

‖The death rate for the city is 118.0 and for the asylum 1006.5.

THE PREVALENCE OF TUBERCULOSIS AMONG THOSE OF SCHOOL AGE (5-19 YEARS INCLUSIVE) IN URBAN AND RURAL LOCALITIES IN 1912.

The following special table has been prepared for the purpose of ascertaining the influence of school life in the prevalence of tuberculosis, and to determine whether the disease is more prevalent among school children in thickly settled communities as compared with sparsely settled localities.

By this table it will be seen that of the urban localities the death rate from tuberculosis of those of school age, increases with the decrease of the population, with the exception of the cities and villages of from 5,000 to 10,000 inhabitants. Comparing the death rate of the rural localities with that of the urban, we find that the death rate of those of school age living in the rural localities was 50 per cent lower than the urban rate.

Table showing the influence of the density of population on the prevalence of tuberculosis in schools of Michigan, in 1912, as indicated by the death rates per 100,000 population of those living at school age (5–19 years, inclusive).

Localities (grouped according to density of population.)	School population (5-19 inclusive).	Cases.*	Deaths.	Death rates per 100,000 of the school population.
Cities over 50,000	156,849	258	82	52.3
Cities from 25,000 to 50,000	50,327	51	27	53.6
Cities from 10,000 to 25,000	58,047	80	45	77.5
Cities and villages from 5,000 to 10,000	53,878	43	16	29.7
Cities and villages under 5,000	36,735	78	48	130.7
Total urban	355,836	510	218	61.2
Rural localities (townships)	452,839	232	138	30.5

*These figures represent the number of cases of tuberculosis that were reported to have been in existence at some time during the year 1912 among persons aged from 5-19 years.

THE SEASONAL PREVALENCE OF TUBERCULOSIS.

In order to determine the influence of the seasons on this disease, by showing the number of deaths occurring in each month throughout the year, Table 12 has been compiled.

By this Table it is apparent that the warm weather months seem favorable to arresting the ravages of this disease as the least number of deaths occur during the months of August, September and October, while the greatest number occur during the months of March, April and May.

The accompanying Plate, showing the influence of temperature and sunshine on tuberculosis, serves to illustrate the above statements:

TABLE 12.—*The seasonal fatality from pulmonary tuberculosis, in Michigan, as shown by the average number of deaths from this disease in each month in the fifteen years, 1898–1912.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of monthly deaths.	194	198	222	220	214	181	170	164	156	168	160	171

DIAGRAM SHOWING THE AVERAGE NUMBER OF DEATHS PER MONTH FROM PULMONARY TUBERCULOSIS, ALSO AVERAGE MONTHLY TEMPERATURE AND PER CENT OF POSSIBLE SUNSHINE, IN MICHIGAN, FOR THE YEARS, 1898-1912, INCLUSIVE.

LOCATION OF THE DISEASE IN TUBERCULOUS PERSONS.

The location of the disease in tuberculous persons for the period of eighteen years, ending with 1912, is shown in Table 13. With a view to aiding this study the body has been divided into five divisions, as follows: Cranial cavity, spine, thoracic cavity, abdominal cavity and joints. As may be seen by the table the disease was located in the thoracic cavity in nearly seven times as many instances as in all the other divisions combined. Usually the disease was located in more than one part of the body, and in many instances, several different organs or parts at the same time.

TABLE 13.—*Location of the disease in tuberculous persons, in Michigan, in the eighteen years, 1895–1912.*

Part of body.			Number of instances.
Cranial cavity (meninges and membranes)			411
Spine (vertebrae, cord and membranes)			180
Thoracic cavity	Pharynx	14	32,102
	Larynx	395	
	Bronchi	124	
	Lungs	31,250	
	Pleura	38	
	Instances in which the location of the disease was not specified	281	
Abdominal cavity	Stomach	229	2,706
	Liver	98	
	Kidneys	166	
	Spleen	9	
	Bladder	56	
	Intestines	1,541	
	Peritoneum	445	
	Instances in which the location of the disease was not specified	162	
Joints	Shoulder	3	230
	Elbow	5	
	Hip	138	
	Knee	58	
	Joints not specified	26	
Instances in which the disease was located in the tissues or other parts of the body but not definitely specified			1,163

REPORTED SOURCES OF CONTAGIUM.

The difficulty in tracing cases of tuberculosis to their sources is nowhere better illustrated than in the very small number of reports received at this office from year to year which throw any light upon this phase of the study of tuberculosis, and it is probable that, in many instances, where the source is reported, the information is based upon circumstantial evidence only. From the reports of tuberculosis for the years, 1907-1912, it is learned that 723 cases were traced to former cases of the disease, and that in 1,795 instances the patients had tuberculous relatives or associates.

In reply to the question, "Can you trace any other case of tuberculosis to this case?" the health officer answered "Yes" in 78 instances during the years, 1907-1912.

INFLUENCES OF AGE AND SEX IN TUBERCULOSIS.

That age and sex have a great influence on the death rate from tuberculosis is attested by the facts contained in the following three tables: Tables 14, 14A and 14B.

Table 14, the figures which cover a period of nineteen years, 1894-1912, shows the number of deaths from tuberculosis of those of known ages and of each sex. By this Table it would seem that the females compared with the males are responsible for a larger percentage of the deaths occurring from this disease.

Table 14 shows that 31 per cent of those who died from this disease were between 20 and 29 years of age and that 21 per cent were between 30 and 39, while the deaths from pneumonia, a very prevalent disease, at the same ages caused only 5 and 6 per cent of the deaths respectively. It is seen, then, that the majority of deaths from tuberculosis occur at the most valuable period of a person's life, the working, the reproductive period, the age when the life of the individual is of the greatest economic value to the community and his death of the greatest economic loss. This fact is, perhaps, the saddest of all the grim facts connected with the ravages of tuberculosis.

Table 14A takes up the study of influence of age and sex in tuberculosis, by showing the death rate per 100,000 persons of the same age and sex.

The age and sex of those persons who died from this disease in 1912 were stated in 2,650 instances, which would give a death rate at all ages of 91.4 instead of 94.5, which rate would be shown if all ages had been reported.

By this table it will be seen that, in 1912, beginning with those ages under one year, the death rate per 100,000 persons living at the same age decreases with the advancement of age up to the tenth year, when there is a gradual increase in the death rate with the advancement of age up to the 70th year.

As stated previously, the persons whose ages are from 20-39 years of age suffer most from this disease, which fact is also borne out by this table. The rate for those persons whose ages are from 20-24, is 146.1 per 100,000 of those living at that age; 25-29 years, 150.0; 30-34 years, 125.7 and 35-39 years, 135.7.

It will also be seen by Table 11A, that in proportion to their numbers, the males, in 1912, suffered more from this disease than the females, the rate for males being 95.5 per 100,000 males in Michigan and 87.0 for the females. If the two populations had been identical, their ratios would be, at all ages, that for every 100 females who died, 110 deaths would occur among the males. At the ages of from 25-29 years, when the greatest death rates occurred, the females seem to have paid the heavier tribute to this disease, as for every 100 deaths of females there were only 90 among the males.

The average age of all persons who died from tuberculosis during the years 1894-1912 was 34.2 years; the average age of the males was 36.0 years, and the females 32.6 years.

The figures in Table 14B, pertaining to Michigan, are taken from the U. S. report for 1912, and show that, of those who died in 1912, the

number of chances to one that the death was not due to tuberculosis, or, in other words, the number of deaths that were due to other causes to one from tuberculosis. Starting with those under one year of age, the number of deaths due to other causes than tuberculosis decrease with the advancement of age up to the 30th year, when the causes of death, other than tuberculosis increase with the advancement of age. At the ages of from 20-29, there occurred only two deaths from other causes to one from tuberculosis, or, tuberculosis was responsible for one death out of every three that occurred at those ages.

TABLE 14.—*The influence of age and sex in tuberculosis, as indicated by the number of males and females who died at the various ages, and their per cent to the total deaths from this disease, in Michigan, in the nineteen years, 1894–1912.*

Age groups.	Number.			Per cent.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 10 years	797	815	1,612	2.06	2.12	4.18
10 to 19 years	1,627	2,936	4,563	4.22	7.62	11.84
20 to 29 years	5,288	6,657	11,945	13.73	17.28	31.01
30 to 39 years	3,790	4,263	8,053	9.84	11.06	20.90
40 to 49 years	2,733	2,286	5,019	7.10	5.93	13.03
50 to 59 years	2,054	1,398	3,452	5.33	3.63	8.96
60 to 69 years	1,357	1,155	2,512	3.52	3.00	6.52
70 to 79 years	638	540	1,178	1.66	1.40	3.06
80 years and over	87	103	190	.23	.27	.50
All known ages	18,371	20,153	38,524	47.69	52.31	100.00

TABLE 14A.—*The influence of age and sex in fatal cases of tuberculosis (all forms) as indicated by the death rates per 100,000 population of the same age and sex, and the ratio of death rates of males to the death rates of females. These data are for the State of Michigan in the year 1912.*

Age groups.	Deaths from all forms of tuberculosis in 1912.			Death rates per 100,000 population of same age and sex, in 1912.			Ratio of death rates of males to death rates of females.
	Total.	Males.	Females.	Total.	Males.	Females.	
All known ages	2,650	1,436	1,214	91.4	95.5	87.0	110
Under 1 year	43	27	16	67.7	84.0	51.0	165
1 year	26	15	11	44.0	50.3	37.5	134
2 years	20	9	11	31.7	28.0	35.6	79
3 years	13	7	6	20.8	22.1	19.5	113
4 years	13	5	8	21.2	16.2	26.3	62
Under 5 years	115	63	52	37.2	40.2	34.1	118
5 to 9 years	53	28	25	19.1	19.1	18.2	109
10 to 14 years	65	25	40	25.3	19.3	31.4	61
15 to 19 years	231	108	123	84.3	77.3	91.6	84
20 to 24 years	403	209	194	146.1	145.9	146.2	100
25 to 29 years	377	189	188	150.0	142.2	158.7	90
30 to 34 years	277	149	128	125.7	129.1	122.0	106
35 to 39 years	269	146	123	135.7	140.5	130.3	107
40 to 44 years	202	109	93	114.9	115.7	111.2	104
45 to 49 years	149	97	52	94.7	116.7	70.0	166
50 to 54 years	144	100	44	100.3	130.2	65.9	198
55 to 59 years	125	81	44	115.8	138.6	88.9	156
60 to 64 years	94	59	35	108.9	129.1	86.2	150
65 to 69 years	73	37	36	103.5	99.3	108.3	92
70 to 74 years	33	17	16	72.3	71.6	73.2	98
75 to 79 years	27	14	13	93.9	94.0	96.0	98
80 years and over	13	5	8	64.9	49.9	79.9	62

TABLE 14B.—*Showing, that of those who die, the number of chances against one that the death was not due to some form of tuberculosis, at various age groups, as indicated by the number of deaths from all causes and all forms of tuberculosis, that occurred at various ages, in Michigan, in 1912.*

Age groups.	Deaths from all causes.	Deaths from tuberculosis (all forms).	Of those who die, the number of chances against ONE that the death was due to some form of tuberculosis.
All ages	38,756	2,731	13
Under 1 year	6,926	54	127
1 year	1,084	29	36
2 years	506	19	26
3 years	347	13	26
4 years	235	15	15
Under 5 years	9,098	130	69
5 to 9 years	789	54	14
10 to 19 years	1,515	306	4
20 to 29 years	2,657	797	2
30 to 39 years	2,602	555	4
40 to 49 years	2,916	359	7
50 to 59 years	3,968	279	13
60 to 69 years	5,432	175	30
70 to 79 years	5,902	60	97
80 to 89 years	3,228	11	292
90 years and over	553	1	552
Unknown	96	4	23

NOTE.—The number of deaths taken from the U. S. report of 1912.

INFLUENCE OF COLOR IN TUBERCULOSIS.

Table 15 shows the approximate proportion of each color of the population to the total population, also the proportion of the deaths from tuberculosis of each color to the total deaths. The figures contained in this table show that the disease was more prevalent among the colored population, compared with the white. Table 9 may well be studied in this connection, as that table shows the death rates per 100,000 of each population, and by which it is shown that the rate in Michigan in 1911 was for the whites, 78.2, and for the colored, 416.9. It would, perhaps, be opportune to call the attention of the reader to the fact that, owing to the very high death rate from this disease among the colored population, allowance should be made for the high percentage of colored population in some of the States of the Registration Area in comparing one state with another, and perhaps the same might be said in making comparisons with certain cities of this State.

TABLE 15.—*The color of some of the tuberculous persons, in Michigan, reported during the eighteen years, 1895–1912.*

Color.	Number of instances in which the color was stated.	Per cent.	Approximate proportion of the total population of the State.—Expressed in per cents.
White	42,476	96.76	96.08
Black (Negro)	836	1.90	.64
Red (Indian)	583	1.33	.26
Yellow (Japanese and Chinese)	3	.01	.26

MARITAL CONDITION OF TUBERCULOUS PERSONS.

During the years 1895-1912, the reports of cases in which the marital condition of patients were stated, showed that 58 per cent of the patients were or had been married, and that 42 per cent were single.

INFLUENCE OF OCCUPATION IN TUBERCULOSIS.

There are certain occupations which seem particularly prone to predispose those who follow them, to tuberculosis; this they do probably both by their influence upon the lung tissue itself as well as upon the general health. Those employed where there is much dust, such as stone-cutters, knife-grinders, dyers, cigarmakers, polishers, etc., especially where the work is carried on in confined places, have always suffered a large mortality from tuberculosis.

Mr. Hoffman, Statistician of the Prudential Life Insurance Company, in an analysis of 22,987 deaths from all causes in those engaged in dusty occupations, found that the proportionate mortality from consumption was 28.0 per cent of the mortality from all causes at ages fifteen and over, while among men in agricultural, transportation, and other outdoor occupations, the consumption death rate was only 9.5 per cent of the mortality from all causes. "If," he says, "the consumption mortality in dusty trades could be reduced to the corresponding proportion for men in outdoor occupations," which he believes is possible, "a very large number of lives would be saved and continue for many years, which are now, to a large extent, needlessly wasted."

In the tables following may also be seen that printers, compositors, dressmakers, bakers, and those who work where smoke and irritating gases are generated contract tuberculosis readily. In certain factories and workshops where the employes are crowded together in a confined atmosphere and where there is an absence of sufficient light, tuberculosis is frequent. Probably two causes are at work under these conditions: In the first place, lowering of the vitality and, secondly, the danger that some workman may be tuberculous and infect his fellow workers if he is not careful to destroy or safely dispose of his sputum. To illustrate the second danger, the following case is quoted from "Tuberculosis, Its Cause, Cure and Prevention," by Edward O. Otis, M. D.": "In a small and ill-ventilated portion of a counting-house containing twenty-two employes, there came two tuberculous persons, coughing and expectorat-

ing often upon the floor. The employes came early in the morning to work, when the air of the place was filled with dust from the daily sweeping. Within five years thirteen of these employes died of tuberculosis."

Under the caption, "Recapitulation of certain occupations by age groups and sex," may be seen those occupations at which both sexes are occupied, and their comparative mortality.

At all occupations and at all ages over fifteen the occupied female seems to be more susceptible to this disease than the male, as pulmonary tuberculosis causes 21.0 per cent of the deaths of the former compared with 14.8 per cent for the male.

The female school teacher suffers more from this disease than the male school teacher, the rate for the female being 21.4, compared with the male rate of 15.0. Females following the occupations of bookkeepers, clerks and copyists, saleswomen, bookbinders, cotton mill operatives, silk mill operatives, woolen mill operatives, tailoresses and tobacco and cigar factory operatives have a higher percentage of deaths from pulmonary tuberculosis than the males following the same occupations. Among the females, tobacco and cigar factory operatives seem to pay a higher tribute to this disease than any of their other occupations. Of those who died, that followed this occupation, 40.8 per cent of their deaths was due to pulmonary tuberculosis.

The tables dealing with the occupations of those persons who died from pulmonary tuberculosis are taken from the United States report for 1909, and deal with the States of the Registration Area as a whole. (The States of the Registration Area are shown in Table 9.)

The prevalence from pulmonary tuberculosis in each of the occupations shown in the following tables is indicated by the proportionate mortality from pulmonary tuberculosis, or, in other words, of the deaths occurring from all causes, by each occupation, the per cent due to pulmonary tuberculosis.

Deaths of males from all causes and at all ages in the Registration Area of the United States, in 1909, numbered 398,597, and of these, whose ages were 15 and over, 210,507 or 52.8 per cent, were stated to have had gainful occupations. Deaths from tuberculosis of the lungs at all ages numbered 39,456, and of these 31,052, or 78.7 per cent, whose ages were 15 years and over, were stated to have had gainful occupations.

Deaths of females from all causes and at all ages in the Registration Area of the United States in 1909 numbered 333,941, and of those whose ages were 15 years and over, 27,459, or 8.2 per cent, were stated to have had gainful occupations. Deaths from tuberculosis of the lungs at all ages numbered 30,584, and of this number, those whose ages were 15 years and over, 5,745, or 18.8 per cent, were stated to have had gainful occupations.

TABLE 16.—*The influence of occupation in pulmonary tuberculosis, as indicated by the proportionate mortality from this disease, in 1909, in the Registration Area of United States. Arranged by age groups and sex.*

MALES.

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths
ALL OCCUPATIONS	31,052	14.8
15 to 19 years	1,231	23.0
20 to 24 years	3,861	31.7
25 to 34 years	8,880	31.0
35 to 44 years	7,675	23.6
45 to 54 years	5,140	14.4
55 to 64 years	2,707	7.5
65 to 74 years	1,220	3.6
75 years and over	314	1.2
Unknown	24	8.3
AGRICULTURAL PURSUITS	4,436	8.7
15 to 19 years	228	18.4
20 to 24 years	545	27.1
25 to 34 years	974	26.2
35 to 44 years	797	19.3
45 to 54 years	716	12.3
55 to 64 years	566	6.7
65 to 74 years	448	3.8
75 years and over	153	1.1
Unknown	9	8.7
Agricultural laborers	1,912	14.5
15 to 19 years	145	20.7
20 to 24 years	298	29.2
25 to 34 years	515	28.6
35 to 44 years	341	20.0
45 to 54 years	291	14.9
55 to 64 years	190	8.4
65 to 74 years	95	4.4
75 years and over	30	2.0
Unknown	7	12.1
Farmers, planters and overseers	2,275	6.6
15 to 19 years	77	15.6
20 to 24 years	230	26.5
25 to 34 years	405	24.9
35 to 44 years	393	18.8
45 to 54 years	371	11.0
55 to 64 years	339	6.1
65 to 74 years	338	3.7
75 years and over	121	1.1
Unknown	1	3.6
Stockraisers, herders and drovers	76	9.8
15 to 19 years	3	25.0
20 to 24 years	6	21.4
25 to 34 years	25	31.6
35 to 44 years	15	16.5
45 to 54 years	13	9.6
55 to 64 years	12	7.6
65 to 74 years	2	1.3
75 years and over	0	.....
Unknown	0	.....
PROFESSIONAL SERVICE	1,105	12.0
15 to 19 years	24	26.4
20 to 24 years	139	32.9
25 to 34 years	400	33.6
35 to 44 years	271	20.4
45 to 54 years	155	9.9
55 to 64 years	75	4.4
65 to 74 years	36	2.1
75 years and over	5	0.4
Unknown	0	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
PROFESSIONAL SERVICE.—Continued.		
Architects, designers, draftsmen, etc	57	16.3
15 to 19 years	1	33.3
20 to 24 years	16	40.0
25 to 34 years	21	33.3
35 to 44 years	11	24.9
45 to 54 years	5	8.9
55 to 64 years	2	3.4
65 to 74 years	1	2.2
75 years and over	0	.....
Unknown	0	.....
Lawyers	99	7.5
15 to 19 years	0	.....
20 to 24 years	3	30.0
25 to 34 years	27	25.7
35 to 44 years	28	19.9
45 to 54 years	21	8.9
55 to 64 years	15	5.0
65 to 74 years	5	1.5
75 years and over	0	.....
Unknown	0	.....
Clergymen	80	6.6
15 to 19 years	0	.....
20 to 24 years	4	50.0
25 to 34 years	25	41.0
35 to 44 years	20	19.2
45 to 54 years	16	9.1
55 to 64 years	7	2.7
65 to 74 years	6	2.0
75 years and over	2	0.6
Unknown	0	.....
Musicians and teachers of music	140	23.4
15 to 19 years	7	63.6
20 to 24 years	22	50.0
25 to 34 years	64	50.0
35 to 44 years	27	23.5
45 to 54 years	13	12.9
55 to 64 years	5	6.7
65 to 74 years	2	2.5
75 years and over	0	.....
Unknown	0	.....
Physicians and surgeons	94	6.6
15 to 19 years	0	.....
20 to 24 years	1	10.0
25 to 34 years	21	21.2
35 to 44 years	29	15.8
45 to 54 years	23	9.2
55 to 64 years	12	4.0
65 to 74 years	6	1.8
75 years and over	2	0.8
Unknown	0	.....
Teachers and professors in colleges, etc	88	15.0
15 to 19 years	4	30.8
20 to 24 years	14	27.5
25 to 34 years	36	43.4
35 to 44 years	14	18.7
45 to 54 years	11	13.6
55 to 64 years	6	5.6
65 to 74 years	3	2.7
75 years and over	0	.....
Unknown	0	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
DOMESTIC AND PERSONAL SERVICE	8,184	19.7
15 to 19 years	321	27.0
20 to 24 years	962	32.5
25 to 34 years	2,358	32.3
35 to 44 years	2,133	25.5
45 to 54 years	1,433	17.1
55 to 64 years	702	10.2
65 to 74 years	229	5.1
75 years and over	37	1.9
Unknown	9	20.0
Barbers and hairdressers	334	23.9
15 to 19 years	14	35.0
20 to 24 years	38	44.7
25 to 34 years	115	40.6
35 to 44 years	89	25.8
45 to 54 years	51	16.2
55 to 64 years	21	11.7
65 to 74 years	2	2.0
75 years and over	3	6.4
Unknown	1	33.3
Bartenders	311	27.9
15 to 19 years	1	20.0
20 to 24 years	8	20.5
25 to 34 years	133	37.0
35 to 44 years	130	29.4
45 to 54 years	36	17.7
55 to 64 years	1	1.9
65 to 74 years	1	8.3
75 years and over	0	.....
Unknown	1	33.3
Launderers	93	26.5
15 to 19 years	1	16.7
20 to 24 years	6	33.3
25 to 34 years	20	31.3
35 to 44 years	26	28.9
45 to 54 years	26	31.3
55 to 64 years	14	19.7
65 to 74 years	0	.....
75 years and over	0	.....
Unknown	0	.....
Nurses	22	17.5
15 to 19 years	0	.....
20 to 24 years	2	20.0
25 to 34 years	4	20.0
35 to 44 years	11	36.7
45 to 54 years	3	10.3
55 to 64 years	2	10.5
65 to 74 years	0	.....
75 years and over	0	.....
Unknown	0	.....
Saloonkeepers	151	15.5
15 to 19 years	0	.....
20 to 24 years	2	20.0
25 to 34 years	43	29.3
35 to 44 years	59	18.9
45 to 54 years	43	13.8
55 to 64 years	4	2.9
65 to 74 years	0	.....
75 years and over	0	.....
Unknown	0	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
DOMESTIC AND PERSONAL SERVICE.—Continued:		
Watchmen, Policemen and Firemen	206	8.7
15 to 19 years	0	.....
20 to 24 years	6	17.1
25 to 34 years	46	24.2
35 to 44 years	56	17.8
45 to 54 years	50	9.5
55 to 64 years	32	4.9
65 to 74 years	13	2.7
75 years and over	3	2.1
Unknown	.....	.....
Servants and Waiters	833	27.6
15 to 19 years	39	36.1
20 to 24 years	96	44.7
25 to 34 years	280	40.4
35 to 44 years	208	29.7
45 to 54 years	130	20.2
55 to 64 years	69	17.0
65 to 74 years	11	6.2
75 years and over	0	.....
Unknown	0	.....
TRADES AND TRANSPORTATION	7,453	16.6
15 to 19 years	345	24.2
20 to 24 years	1,075	32.6
25 to 34 years	2,533	31.9
35 to 44 years	1,872	22.8
45 to 54 years	1,024	12.3
55 to 64 years	432	5.8
65 to 74 years	145	2.6
75 years and over	27	1.0
Unknown	.....	.....
Bankers and Brokers (Employes)	42	5.9
15 to 19 years	0	.....
20 to 24 years	2	50.0
25 to 34 years	13	36.1
35 to 44 years	9	12.2
45 to 54 years	4	3.4
55 to 64 years	8	4.6
65 to 74 years	4	2.4
75 years and over	2	1.4
Unknown	.....	.....
Book-keepers and Accountants	391	22.5
15 to 19 years	19	50.0
20 to 24 years	70	42.9
25 to 34 years	149	42.9
35 to 44 years	93	31.6
45 to 54 years	36	12.9
55 to 64 years	16	5.2
65 to 74 years	7	3.0
75 years and over	1	1.3
Unknown	.....	.....
Clerks and Copyists	2,088	28.3
15 to 19 years	179	29.7
20 to 24 years	465	44.7
25 to 34 years	779	44.2
35 to 44 years	409	31.5
45 to 54 years	180	17.0
55 to 64 years	61	7.2
65 to 74 years	14	2.4
75 years and over	1	6.6
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
TRADES AND TRANSPORTATION.—Continued.		
Commercial Travelers	54	10.0
15 to 19 years	0	.....
20 to 24 years	4	23.5
25 to 34 years	23	29.5
35 to 44 years	12	12.5
45 to 54 years	7	4.8
55 to 64 years	6	5.3
65 to 74 years	2	2.7
75 years and over	.....	.....
Unknown	.....	.....
Draymen, hackmen, teamsters, etc	1,353	23.4
15 to 19 years	45	25.0
20 to 24 years	133	30.2
25 to 34 years	477	35.7
35 to 44 years	401	29.3
45 to 54 years	198	18.2
55 to 64 years	75	10.2
65 to 74 years	21	4.8
75 years and over	3	1.5
Unknown	.....	.....
Merchants and dealers (wholesale)	20	8.4
15 to 19 years	0	.....
20 to 24 years	0	.....
25 to 34 years	1	5.9
35 to 44 years	8	26.7
45 to 54 years	4	8.3
55 to 64 years	4	6.8
65 to 74 years	3	6.0
75 years and over	0	.....
Unknown	0	.....
Merchants and dealers (except wholesale)	921	9.9
15 to 19 years	10	24.4
20 to 24 years	60	33.5
25 to 34 years	254	30.3
35 to 44 years	256	18.7
45 to 54 years	193	10.2
55 to 64 years	108	5.2
65 to 74 years	33	1.8
75 years and over	7	0.6
Unknown	.....	.....
Porters and helpers (in stores, etc.)	355	28.4
15 to 19 years	17	41.5
20 to 24 years	57	44.5
25 to 34 years	101	38.3
35 to 44 years	102	31.6
45 to 54 years	57	21.6
55 to 64 years	16	10.3
65 to 74 years	4	6.6
75 years and over	1	7.1
Unknown	.....	.....
Steam R. R. Employes	389	7.0
15 to 19 years	3	1.6
20 to 24 years	43	7.3
25 to 34 years	145	10.5
35 to 44 years	104	9.2
45 to 54 years	62	6.6
55 to 64 years	23	3.2
65 to 74 years	7	1.7
75 years and over	2	1.3
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
TRADES AND TRANSPORTATION.—Continued.		
Street Railway Employes	132	18.9
15 to 19 years	4	26.7
20 to 24 years	26	31.0
25 to 34 years	61	29.3
35 to 44 years	30	16.6
45 to 54 years	6	4.9
55 to 64 years	4	7.5
65 to 74 years	1	4.2
75 years and over	.....	.....
Unknown	.....	.....
Stenographers and Typewriters	57	37.0
15 to 19 years	5	22.7
20 to 24 years	25	46.3
25 to 34 years	21	44.7
35 to 44 years	6	30.0
45 to 54 years	.....	.....
55 to 64 years	.....	.....
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Telegraph and Telephone Operators	97	29.1
15 to 19 years	5	23.8
20 to 24 years	24	43.6
25 to 34 years	34	42.0
35 to 44 years	24	28.6
45 to 54 years	10	18.9
55 to 64 years	.....	.....
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Undertakers	32	12.9
15 to 19 years	0	.....
20 to 24 years	8	61.5
25 to 34 years	9	33.3
35 to 44 years	8	23.5
45 to 54 years	4	7.8
55 to 64 years	1	2.1
65 to 74 years	2	3.8
75 years and over	.....	.....
Unknown	.....	.....
Salesmen (store)	404	15.8
15 to 19 years	6	16.7
20 to 24 years	44	36.1
25 to 34 years	146	32.5
35 to 44 years	112	21.1
45 to 54 years	63	11.1
55 to 64 years	26	5.3
65 to 74 years	6	2.3
75 years and over	1	1.4
Unknown	.....	.....
MANUFACTURING AND MECHANICAL PURSUITS	9,874	15.5
15 to 19 years	313	22.1
20 to 24 years	1,140	32.5
25 to 34 years	2,615	30.8
35 to 44 years	2,602	25.0
45 to 54 years	1,812	15.6
55 to 64 years	932	8.2
65 to 74 years	362	3.7
75 years and over	92	1.3
Unknown	6	8.5

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Building Trades		
Carpenters and joiners	792	10.0
15 to 19 years	6	16.2
20 to 24 years	58	31.2
25 to 34 years	147	26.0
35 to 44 years	197	22.5
45 to 54 years	171	13.6
55 to 64 years	138	8.0
65 to 74 years	55	3.1
75 years and over	19	1.2
Unknown	1	8.3
Masons (brick and stone)	333	13.9
15 to 19 years	.....	.....
20 to 24 years	22	35.5
25 to 34 years	62	33.0
35 to 44 years	103	29.8
45 to 54 years	82	19.6
55 to 64 years	38	7.4
65 to 74 years	21	4.5
75 years and over	4	1.0
Unknown	1	50.0
Painters, glaziers and varnishers	704	18.9
15 to 19 years	11	20.4
20 to 24 years	68	41.0
25 to 34 years	175	37.2
35 to 44 years	215	28.4
45 to 54 years	146	17.3
55 to 64 years	72	9.8
65 to 74 years	16	3.3
75 years and over	1	0.5
Unknown	.....	.....
Paper-hangers	52	23.9
15 to 19 years	1	33.3
20 to 24 years	3	25.0
25 to 34 years	16	44.4
35 to 44 years	20	33.3
45 to 54 years	9	21.2
55 to 64 years	1	3.0
65 to 74 years	2	8.0
75 years and over	.....	.....
Unknown	.....	.....
Plasterers	84	17.6
15 to 19 years	.....	.....
20 to 24 years	6	33.3
25 to 34 years	15	28.8
35 to 44 years	36	41.9
45 to 54 years	15	18.3
55 to 64 years	9	6.7
65 to 74 years	7	7.5
75 years and over	.....	.....
Unknown	.....	.....
Plumbers, gas and steam fitters	344	29.2
15 to 19 years	15	39.5
20 to 24 years	39	37.5
25 to 34 years	117	43.2
35 to 44 years	116	35.9
45 to 54 years	31	14.6
55 to 64 years	24	18.3
65 to 74 years	2	2.8
75 years and over	.....	.....
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Roofers and slaters	42	19.0
15 to 19 years	.....	.....
20 to 24 years	3	30.0
25 to 34 years	9	25.0
35 to 44 years	11	22.4
45 to 54 years	12	25.0
55 to 64 years	5	14.3
65 to 74 years	2	8.0
75 years and over	.....	.....
Unknown	.....	.....
Glass and Stone Products.		
Glassworkers	142	31.2
15 to 19 years	5	17.9
20 to 24 years	38	67.9
25 to 34 years	52	44.0
35 to 44 years	28	31.8
45 to 54 years	13	23.2
55 to 64 years	4	7.4
65 to 74 years	2	5.6
75 years and over	.....	.....
Unknown	.....	.....
Marble and stone cutters	235	28.6
15 to 19 years	1	10.0
20 to 24 years	4	19.0
25 to 34 years	35	46.7
35 to 44 years	64	41.0
45 to 54 years	76	43.4
55 to 64 years	42	19.3
65 to 74 years	13	12.5
75 years and over	.....	.....
Unknown	.....	.....
Food and Kindred Products.		
Bakers	173	18.2
15 to 19 years	2	10.5
20 to 24 years	17	30.9
25 to 34 years	41	29.1
35 to 44 years	51	29.0
45 to 54 years	37	18.7
55 to 64 years	17	9.4
65 to 74 years	7	5.8
75 years and over	1	1.6
Unknown	.....	.....
Butchers	243	16.2
15 to 19 years	4	20.0
20 to 24 years	19	31.1
25 to 34 years	82	39.4
35 to 44 years	67	22.9
45 to 54 years	47	13.8
55 to 64 years	20	6.8
65 to 74 years	3	1.6
75 years and over	1	1.0
Unknown	.....	.....
Confectioners	38	20.7
15 to 19 years	1	16.7
20 to 24 years	4	30.8
25 to 34 years	12	34.3
35 to 44 years	13	33.3
45 to 54 years	5	15.6
55 to 64 years	2	6.9
65 to 74 years	.....	.....
75 years and over	1	8.3
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Food and Kindred Products.—Continued.		
Millers	30	7.1
15 to 19 years	1	25.0
20 to 24 years	2	33.3
25 to 34 years	5	41.7
35 to 44 years	6	21.4
45 to 54 years	2	5.1
55 to 64 years	4	4.6
65 to 74 years	8	6.7
75 years and over	2	1.6
Unknown	.....	.....
Iron and Steel and their Products.		
Blacksmiths	279	11.4
15 to 19 years	3	13.6
20 to 24 years	21	36.2
25 to 34 years	64	29.6
35 to 44 years	76	27.1
45 to 54 years	65	15.9
55 to 64 years	29	6.0
65 to 74 years	13	2.6
75 years and over	8	1.7
Unknown	.....	.....
Steam-boiler makers	77	19.6
15 to 19 years	4	44.4
20 to 24 years	4	11.8
25 to 34 years	21	30.9
35 to 44 years	24	29.3
45 to 54 years	11	16.4
55 to 64 years	10	14.7
65 to 74 years	3	7.0
75 years and over	.....	.....
Unknown	.....	.....
Stove, furnace and grate makers	17	25.0
15 to 19 years	4	80.0
20 to 24 years	.....	.....
25 to 34 years	6	46.2
35 to 44 years	3	33.3
45 to 54 years	2	18.2
55 to 64 years	.....	.....
65 to 74 years	2	16.7
75 years and over	.....	.....
Unknown	.....	.....
Tool and cutlery makers	58	24.1
15 to 19 years	1	16.7
20 to 24 years	3	18.8
25 to 34 years	15	40.8
35 to 44 years	19	42.2
45 to 54 years	10	26.3
55 to 64 years	8	19.0
65 to 74 years	2	5.6
75 years and over	.....	.....
Unknown	.....	.....
Leather and its Finished Products.		
Boot and shoe makers and repairers	361	13.4
15 to 19 years	22	29.7
20 to 24 years	52	42.6
25 to 34 years	91	35.5
35 to 44 years	83	31.9
45 to 54 years	57	16.8
55 to 64 years	30	6.6
65 to 74 years	20	3.4
75 years and over	6	1.0
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Leather and its finished products.—Continued.		
Harness and saddle makers and repairers	52	12.1
15 to 19 years	1	50.0
20 to 24 years	8	66.7
25 to 34 years	6	33.3
35 to 44 years	5	15.6
45 to 54 years	18	23.1
55 to 64 years	9	9.7
65 to 74 years	2	1.9
75 years and over	3	3.5
Unknown	.....	.....
Leather curriers and tanners	67	15.3
15 to 19 years	1	20.0
20 to 24 years	11	52.4
25 to 34 years	17	31.5
35 to 44 years	21	30.4
45 to 54 years	13	14.4
55 to 64 years	4	5.0
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Liquors and Beverages.		
Brewers and malsters	44	17.4
15 to 19 years	.....	.....
20 to 24 years	5	62.5
25 to 34 years	8	33.3
35 to 44 years	10	22.7
45 to 54 years	16	22.5
55 to 64 years	4	6.3
65 to 74 years	1	3.7
75 years and over	.....	.....
Unknown	.....	.....
Distillers and rectifiers	6	22.2
15 to 19 years	.....	.....
20 to 24 years	1	100.0
25 to 34 years	.....	.....
35 to 44 years	5	71.4
45 to 54 years	.....	.....
55 to 64 years	.....	.....
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Lumber and its Re-manufactures.		
Cabinet makers	69	10.9
15 to 19 years	4	66.7
20 to 24 years	6	37.5
25 to 34 years	19	31.7
35 to 44 years	17	34.7
45 to 54 years	16	16.8
55 to 64 years	4	3.5
65 to 74 years	2	1.2
75 years and over	1	0.8
Unknown	.....	.....
Coopers	78	13.7
15 to 19 years	.....	.....
20 to 24 years	3	23.1
25 to 34 years	10	33.3
35 to 44 years	27	45.8
45 to 54 years	20	23.8
55 to 64 years	9	10.1
65 to 74 years	6	4.3
75 years and over	3	2.0
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Metals and Metal Products Other than Iron and Steel.		
Brassworkers	64	31.8
15 to 19 years	3	50.0
20 to 24 years	13	68.4
25 to 34 years	21	50.0
35 to 44 years	11	31.4
45 to 54 years	8	16.8
55 to 64 years	4	15.4
65 to 74 years	2	12.5
75 years and over	2	22.2
Unknown	.....	.....
Clock and watch makers and repairers	29	20.1
15 to 19 years	.....	.....
20 to 24 years	6	75.0
25 to 34 years	11	57.9
35 to 44 years	3	18.8
45 to 54 years	3	10.8
55 to 64 years	5	15.6
65 to 74 years	1	4.3
75 years and over	.....	.....
Unknown	.....	.....
Paper and Printing.		
Bookbinders	32	21.1
15 to 19 years	4	66.7
20 to 24 years	6	60.0
25 to 34 years	8	29.6
35 to 44 years	6	24.0
45 to 54 years	4	20.0
55 to 64 years	2	6.9
65 to 74 years	2	7.7
75 years and over	.....	.....
Unknown	.....	.....
Engravers	23	20.5
15 to 19 years	2	66.7
20 to 24 years	3	42.9
25 to 34 years	8	34.8
35 to 44 years	5	25.0
45 to 54 years	1	6.7
55 to 64 years	3	15.8
65 to 74 years	1	6.7
75 years and over	.....	.....
Unknown	.....	.....
Printers, lithographers and pressmen	435	29.2
15 to 19 years	31	38.3
20 to 24 years	70	47.6
25 to 34 years	150	51.5
35 to 44 years	107	32.6
45 to 54 years	59	22.3
55 to 64 years	11	6.5
65 to 74 years	7	4.5
75 years and over	.....	.....
Unknown	.....	.....
Textiles.		
Carpet factory operatives	14	20.9
15 to 19 years	1	50.0
20 to 24 years	1	33.3
25 to 34 years	5	71.4
35 to 44 years	4	33.3
45 to 54 years	1	11.1
55 to 64 years	1	9.1
65 to 74 years	1	7.7
75 years and over	.....	.....
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Textiles.—Continued.		
Cotton mill operatives	145	21.2
15 to 19 years	9	19.6
20 to 24 years	21	48.8
25 to 34 years	45	37.8
35 to 44 years	32	27.1
45 to 54 years	26	19.4
55 to 64 years	10	9.4
65 to 74 years	1	1.5
75 years and over	1	2.4
Unknown	.....	.....
Silk mill operatives	51	19.8
15 to 19 years	5	27.8
20 to 24 years	11	50.0
25 to 34 years	11	29.7
35 to 44 years	12	28.6
45 to 54 years	6	13.3
55 to 64 years	3	7.0
65 to 74 years	2	5.4
75 years and over	1	7.7
Unknown	.....	.....
Woolen mill operatives	82	22.3
15 to 19 years	4	30.8
20 to 24 years	13	44.8
25 to 34 years	20	41.7
35 to 44 years	24	35.3
45 to 54 years	11	16.7
55 to 64 years	8	13.6
65 to 74 years	2	3.6
75 years and over	.....	.....
Unknown	.....	.....
Tailors	458	19.0
15 to 19 years	15	32.6
20 to 24 years	67	44.7
25 to 34 years	123	37.7
35 to 44 years	140	33.7
45 to 54 years	76	16.7
55 to 64 years	25	6.9
65 to 74 years	10	3.0
75 years and over	2	0.6
Unknown	.....	.....
Miscellaneous.		
Photography	32	14.9
15 to 19 years	1	33.3
20 to 24 years	.....	.....
25 to 34 years	11	42.3
35 to 44 years	11	25.0
45 to 54 years	6	14.3
55 to 64 years	1	2.4
65 to 74 years	1	2.6
75 years and over	1	7.1
Unknown	.....	.....
Tobacco and cigar factory operatives	239	24.3
15 to 19 years	6	28.6
20 to 24 years	28	57.1
25 to 34 years	67	49.3
35 to 44 years	61	33.7
45 to 54 years	54	23.2
55 to 64 years	15	8.0
65 to 74 years	7	5.8
75 years and over	1	1.9
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Miscellaneous.—Continued.		
Upholsterers	65	19.9
15 to 19 years	1	25.0
20 to 24 years	11	45.8
25 to 34 years	11	32.4
35 to 44 years	22	31.9
45 to 54 years	12	20.7
55 to 64 years	6	10.3
65 to 74 years	1	1 9
75 years and over	1	3.7
Unknown		

TABLE 16.—*Continued.*

FEMALES.

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
ALL OCCUPATIONS	5,745	21.0
15 to 19 years	731	33.3
20 to 24 years	1,454	39.8
25 to 34 years	1,837	35.7
35 to 44 years	959	21.3
45 to 54 years	449	10.3
55 to 64 years	234	5.6
65 to 74 years	61	3.2
75 years and over	19	1.3
Unknown	1	4.8
PROFESSIONAL SERVICE	339	19.7
15 to 19 years	15	24.6
20 to 24 years	94	37.9
25 to 34 years	143	37.1
35 to 44 years	47	16.0
45 to 54 years	20	7.5
55 to 64 years	15	7.6
65 to 74 years	5	3.0
75 years and over	.....	.....
Unknown	.....	.....
Musicians and teachers of music	45	22.6
15 to 19 years	2	25.0
20 to 24 years	16	48.5
25 to 34 years	18	45.0
35 to 44 years	5	13.2
45 to 54 years	3	7.3
55 to 64 years	.....	.....
65 to 74 years	1	7.1
75 years and over	.....	.....
Unknown	.....	.....
Teachers and professors in colleges, etc	251	21.4
15 to 19 years	9	21.4
20 to 24 years	74	37.4
25 to 34 years	104	38.7
35 to 44 years	37	19.1
45 to 54 years	13	7.8
55 to 64 years	10	7.7
65 to 74 years	4	4.0
Unknown	.....	.....
DOMESTIC AND PERSONAL SERVICE	3,293	18.6
15 to 19 years	336	30.0
20 to 24 years	716	37.3
25 to 34 years	1,047	32.9
35 to 44 years	652	21.3
45 to 54 years	328	10.1
55 to 64 years	164	5.0
65 to 74 years	39	3.5
75 years and over	11	1.4
Unknown	.....	.....
Laundresses	202	18.5
15 to 19 years	18	40.0
20 to 24 years	40	41.2
25 to 34 years	70	33.0
35 to 44 years	40	18.5
45 to 54 years	28	11.1
55 to 64 years	4	2.4
65 to 74 years	1	1.3
75 years and over	1	3.2
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
DOMESTIC AND PERSONAL SERVICE.—Continued.		
Nurses and midwives	102	11.1
15 to 19 years	4	16.0
20 to 24 years	20	24.1
25 to 34 years	34	23.3
35 to 44 years	22	18.0
45 to 54 years	13	8.5
55 to 64 years	3	1.9
65 to 74 years	4	2.8
75 years and over	2	2.4
Unknown	.....	.....
Servants and waitresses	2,897	19.5
15 to 19 years	308	29.8
20 to 24 years	643	37.9
25 to 34 years	916	33.9
35 to 44 years	568	22.0
45 to 54 years	272	10.2
55 to 64 years	151	5.5
65 to 74 years	31	3.9
75 years and over	8	1.3
Unknown	.....	.....
TRADES AND TRANSPORTATION	783	30.9
15 to 19 years	146	38.0
20 to 24 years	294	42.3
25 to 34 years	266	39.9
35 to 44 years	56	16.1
45 to 54 years	16	7.7
55 to 64 years	3	2.5
65 to 74 years	1	1.3
75 years and over	1	2.9
Unknown	.....	.....
Bookkeepers and accountants	134	35.7
15 to 19 years	15	34.1
20 to 24 years	47	47.1
25 to 34 years	63	45.0
35 to 44 years	8	13.3
45 to 54 years	1	4.5
55 to 64 years	.....	.....
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Clerks and copyists	269	31.9
15 to 19 years	49	32.9
20 to 24 years	104	43.2
25 to 34 years	88	37.6
35 to 44 years	20	18.9
45 to 54 years	8	12.1
55 to 64 years	.....	.....
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Saleswomen (stores)	106	31.4
15 to 19 years	24	44.4
20 to 24 years	34	40.5
25 to 34 years	31	35.2
35 to 44 years	13	19.1
45 to 54 years	3	12.5
55 to 64 years	.....	.....
65 to 74 years	1	16.7
75 years and over	.....	.....
Unknown	.....	.....

TABLE 16.—*Continued.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS	1,254	27.5
15 to 19 years	230	37.9
20 to 24 years	338	44.4
25 to 34 years	361	40.8
35 to 44 years	192	26.3
45 to 54 years	74	12.3
55 to 64 years	43	9.3
65 to 74 years	11	3.5
75 years and over	4	2.0
Unknown	1	33.3
Paper and Printing.		
Bookbinders	23	39.6
15 to 19 years	4	36.4
20 to 24 years	11	64.7
25 to 34 years	4	28.6
35 to 44 years	3	60.0
45 to 54 years	1	33.3
55 to 64 years	.....	.....
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Textiles.		
Cotton mill operatives	104	29.5
15 to 19 years	21	38.2
20 to 24 years	27	50.9
25 to 34 years	26	35.6
35 to 44 years	19	32.2
45 to 54 years	7	14.9
55 to 64 years	3	9.0
65 to 74 years	.....	.....
75 years and over	1	6.7
Unknown	.....	.....
Silk mill operatives	55	38.5
15 to 19 years	14	38.9
20 to 24 years	16	53.3
25 to 34 years	14	46.7
35 to 44 years	6	30.0
45 to 54 years	4	22.2
55 to 64 years	1	20.0
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Woolen mill operatives	41	29.5
15 to 19 years	7	36.8
20 to 24 years	16	51.3
25 to 34 years	11	42.3
35 to 44 years	4	20.0
45 to 54 years	2	11.8
55 to 64 years	1	5.9
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Dressmakers	196	19.3
15 to 19 years	9	26.5
20 to 24 years	32	32.7
25 to 34 years	75	40.3
35 to 44 years	38	19.9
45 to 54 years	23	11.8
55 to 64 years	12	8.4
65 to 74 years	7	6.5
75 years and over	.....	.....
Unknown	.....	.....

TABLE 16.—*Concluded.*

Occupations and age groups.	Deaths from pulmonary tuberculosis.	Per cent of all deaths.
MANUFACTURING AND MECHANICAL PURSUITS.—Continued.		
Textiles.—Continued.		
Milliners	70	20.6
15 to 19 years	11	35.5
20 to 24 years	23	39.7
25 to 34 years	19	26.8
35 to 44 years	12	21.1
45 to 54 years	3	7.1
55 to 64 years	2	6.3
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Seamstresses	168	24.2
15 to 19 years	16	41.0
20 to 24 years	40	46.0
25 to 34 years	49	43.0
35 to 44 years	38	29.5
45 to 54 years	13	12.2
55 to 64 years	6	6.5
65 to 74 years	4	5.0
75 years and over	2	2.1
Unknown	.....	.....
Tailoresses	55	24.0
15 to 19 years	12	46.2
20 to 24 years	18	41.9
25 to 34 years	12	37.5
35 to 44 years	4	14.8
45 to 54 years	4	12.1
55 to 64 years	5	27.8
65 to 74 years	.....	.....
75 years and over	.....	.....
Unknown	.....	.....
Miscellaneous Industries.		
Tobacco and cigar factory operatives	62	40.8
15 to 19 years	10	32.3
20 to 24 years	15	42.9
25 to 34 years	21	60.0
35 to 44 years	10	40.0
45 to 54 years	2	16.7
55 to 64 years	3	37.5
65 to 74 years	.....	.....
75 years and over	1	100.0
Unknown	.....	.....

RECAPITULATION OF OCCUPATIONAL GROUPS.

MALES.

All occupations.....Out of 100 deaths 14.8 were due to pulmonary tuberculosis.
Agricultural pursuits.....Out of 100 deaths 8.7 were due to pulmonary tuberculosis.
Professional service.....Out of 100 deaths 12.0 were due to pulmonary tuberculosis.
Domestic and personal service.....Out of 100 deaths 19.7 were due to pulmonary tuberculosis.
Trades and transportation.....Out of 100 deaths 16.6 were due to pulmonary tuberculosis.
Manufacturing and mechanical pursuits...Out of 100 deaths 15.5 were due to pulmonary tuberculosis.

FEMALES.

All occupations.....Out of 100 deaths 21.0 were due to pulmonary tuberculosis.
Professional service.....Out of 100 deaths 19.7 were due to pulmonary tuberculosis
Domestic and personal service.....Out of 100 deaths 18.6 were due to pulmonary tuberculosis.
Trades and transportation.....Out of 100 deaths 30.9 were due to pulmonary tuberculosis.
Manufacturing and mechanical pursuits...Out of 100 deaths 27.5 were due to pulmonary tuberculosis.

RECAPITULATION OF CERTAIN OCCUPATIONS BY AGE GROUPS AND SEX.

ALL OCCUPATIONS.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	14.8	21.0
15 to 19 years	23.0	33.3
20 to 24 years	31.7	39.8
25 to 34 years	31.0	35.7
35 to 44 years	23.6	21.3
45 to 54 years	14.4	10.3
55 to 64 years	7.5	5.6
65 to 74 years	3.6	3.2
75 years and over	1.2	1.3
Unknown	8.3	4.8

MUSICIANS AND TEACHERS OF MUSIC.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	23.4	22.6
15 to 19 years	63.6	25.0
20 to 24 years	50.0	48.5
25 to 34 years	50.0	45.0
35 to 44 years	23.5	13.2
45 to 54 years	12.9	7.3
55 to 64 years	6.7	.....
65 to 74 years	2.5	7.1
75 years and over	.....	.....
Unknown	.....	.....

TEACHERS AND PROFESSORS IN COLLEGES, ETC.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	15.0	21.4
15 to 19 years	30.8	21.4
20 to 24 years	27.5	37.4
25 to 34 years	43.4	38.7
35 to 44 years	18.7	19.1
45 to 54 years	13.6	7.8
55 to 64 years	5.6	7.7
65 to 74 years	2.7	4.0
75 years and over	.....	.....
Unknown	.....	.....

LAUNDERERS AND LAUNDRESSES.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	26.5	18.5
15 to 19 years	16.7	40.0
20 to 24 years	33.3	41.2
25 to 34 years	31.3	33.0
35 to 44 years	28.9	18.5
45 to 54 years	31.3	11.1
55 to 64 years	19.7	2.4
65 to 74 years	.....	1.3
75 years and over	.....	3.2
Unknown	.....	.....

NURSES AND MIDWIVES.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	17.5	11.1
15 to 19 years	.....	16.0
20 to 24 years	20.0	24.1
25 to 34 years	20.0	23.3
35 to 44 years	36.7	18.0
45 to 54 years	10.3	8.5
55 to 64 years	10.5	1.9
65 to 74 years	.....	2.8
75 years and over	.....	2.4
Unknown	.....	.....

SERVANTS AND WAITERS.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	27.6	19.5
15 to 19 years	36.1	29.8
20 to 24 years	44.7	37.9
25 to 34 years	40.4	33.9
35 to 44 years	29.7	22.0
45 to 54 years	20.2	10.2
55 to 64 years	17.0	5.5
65 to 74 years	6.2	3.9
75 years and over	.....	1.3
Unknown	.....	.....

BOOKKEEPERS AND ACCOUNTANTS.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	22.5	35.7
15 to 19 years	50.0	34.1
20 to 24 years	42.9	47.1
25 to 34 years	42.9	45.0
35 to 44 years	31.6	13.3
45 to 54 years	12.9	4.5
55 to 64 years	5.2	.....
65 to 74 years	3.0	.....
75 years and over	1.3	.....
Unknown	.....	.....

CLERKS AND COPYISTS.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	28.3	31.9
15 to 19 years	29.7	32.9
20 to 24 years	44.7	43.2
25 to 34 years	44.2	37.6
35 to 44 years	31.5	18.9
45 to 54 years	17.0	12.1
55 to 64 years	7.2	.....
65 to 74 years	2.4	.....
75 years and over	6.6	.....
Unknown	.....	.....

SALESMEN AND SALESWOMEN (STORES).

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	15.8	31.4
15 to 19 years	16.7	44.4
20 to 24 years	36.1	40.5
25 to 34 years	32.5	35.2
35 to 44 years	21.1	19.1
45 to 54 years	11.1	12.5
55 to 64 years	5.3	.....
65 to 74 years	2.3	16.7
75 years and over	1.4	.....
Unknown	.....	.....

BOOKBINDERS

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	21.1	39.6
15 to 19 years	66.7	36.4
20 to 24 years	60.0	64.7
25 to 34 years	29.6	28.6
35 to 44 years	24.0	60.0
45 to 54 years	20.0	33.3
55 to 64 years	6.9	.....
65 to 74 years	7.7	.....
75 years and over	.....	.....
Unknown	.....	.....

COTTON MILL OPERATIVES.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	21.2	29.5
15 to 19 years	19.6	38.2
20 to 24 years	48.8	50.9
25 to 34 years	37.8	35.6
35 to 44 years	27.1	32.2
45 to 54 years	19.4	14.9
55 to 64 years	9.4	9.0
65 to 74 years	1.5	.....
75 years and over	2.4	6.7
Unknown	.....	.....

SILK MILL OPERATIVES.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	19.8	38.5
15 to 19 years	27.8	38.9
20 to 24 years	50.0	53.3
25 to 34 years	29.7	46.7
35 to 44 years	28.6	30.0
45 to 54 years	13.3	22.2
55 to 64 years	7.0	20.0
65 to 74 years	5.4	.....
75 years and over	7.7	.....
Unknown	.....	.....

WOOLEN MILL OPERATIVES.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	22.3	29.5
15 to 19 years	30.8	36.8
20 to 24 years	44.8	51.3
25 to 34 years	41.7	42.3
35 to 44 years	35.3	20.0
45 to 54 years	16.7	11.8
55 to 64 years	13.6	5.9
65 to 74 years	3.6	.....
75 years and over	.....	.....
Unknown	.....	.....

TAILORS AND TAILORESSES.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	19.0	24.0
15 to 19 years	32.6	46.2
20 to 24 years	44.7	41.9
25 to 34 years	37.7	37.5
35 to 44 years	33.7	14.8
45 to 54 years	16.7	12.1
55 to 64 years	6.9	27.8
65 to 74 years	3.0	.....
75 years and over	0.6	.....
Unknown	.....	.....

TOBACCO AND CIGAR FACTORY OPERATIVES.

Age groups.	Per cent of deaths due to pulmonary tuberculosis.	
	Males.	Females.
All ages	24.3	40.8
15 to 19 years	28.6	32.3
20 to 24 years	57.1	42.9
25 to 34 years	49.3	60.0
35 to 44 years	33.7	40.0
45 to 54 years	23.2	16.7
55 to 64 years	8.0	37.5
65 to 74 years	5.8	.....
75 years and over	1.9	100.0
Unknown	.....	.....

BACTERIOLOGICAL DIAGNOSIS IN TUBERCULOSIS.

During the eighteen years, 1895-1912, reports relative to the bacteriological examination of 5,324 samples of sputa of suspected cases of tuberculosis indicate that 95 per cent gave positive and 5 per cent gave negative results.

What is to be learned from the microscopic examination for tubercle bacilli in cases of suspected tuberculosis?

The presence of tubercle bacilli in any discharge proves conclusively that the disease is of tuberculous origin and that the discharge carries the contagion of tuberculosis.

Sanitarians divide tuberculous cases into open and closed. A closed case is one wherein the tubercle bacilli are completely surrounded by body tissue. An open case is one in which the surrounding tissue has broken down and the tuberculous content is being discharged.

A closed case of tuberculosis does not discharge tubercle bacilli and is, consequently, not contagious. Practically every case of tuberculosis begins as a closed case and becomes open only as the disease progresses. Every case of closed tuberculosis should be subjected to frequent microscopic examinations in order to determine when, if ever, it becomes open.

An open case of tuberculosis discharges tubercle bacilli and constitutes a seed center for the disease. Tubercle bacilli in sufficient number to be found by direct microscopic examination are never normally present in the body and the identification of this germ in a discharge from the body makes an unquestionable diagnosis of tuberculosis. The presence of tubercle bacilli indicates a contagious case but not necessarily an advanced case. The bacilli may appear early in the disease with only a small area involved, or they may appear only after large areas have become invaded. The relative number of tubercle bacilli in the discharges cannot be regarded as an index to the severity or activity of the disease. Mild or arrested cases may show tubercle bacilli "very numerous" while advanced or active cases may show tubercle bacilli "very few." The relative number of tubercle bacilli, however, is of importance in determining the amount of the contagion in a given discharge. The danger of contracting the disease from a given individual should be determined, not from the condition of the sick person, but from the amount of the discharge and the number of tubercle bacilli such discharge contains.

RESTRICTIVE AND PREVENTIVE MEASURES IN TUBERCULOSIS.

By table 17 may be seen the per cent of instances in which the various preventive measures were enforced in the fatal cases of this disease occurring in 1912, the average being 65 per cent.

Under the present method of reporting this part of the history of tuberculous persons, we have no way of knowing whether the persons who are still sick with the disease are taking proper precautions to prevent the spread of the disease to others. The most important measure in preventing the spread of tuberculosis is the disinfection of the sputum As long, however, as the tuberculous expectoration is mixed with moist secretions, is wet, the bacilli are imprisoned in this moisture and cannot escape. It is only when the moist secretions, the sputum, becomes dry that the germs are set free and mix with the dust in the air; then the danger begins. Therefore, if follows that when all the expectoration

is destroyed before it becomes dry, then there is no danger from this source. Also a cloth or some article should be held before the mouth of the consumptive when coughing, then there are no tubercle bacilli thrown out into the air.

In cases where the disease is located in the bowels or bladder, great care should be exercised in disinfecting the discharges from those organs.

The disinfection of the room or rooms occupied by tuberculous persons is also very important, and our records *should* show that this precaution was carried out in 100 per cent of the instances, instead of only 66, as was found to be the case in 1912. The necessity of this precaution was recognized as early as 1746, under the reign of Ferdinand VI, in Spain, the idea of the contagiousness of tuberculosis being so prevalent that a royal edict enacted the following very strict laws: "As experience has shown how very dangerous is the use of linen, furniture and other effects which have belonged to persons who have been afflicted or who have died from phthisis or other contagious disease, we commend all physicians to make known the names of such persons who have been ill or who have died with phthisis, so that the Alcalde may have their furniture, linen and other effects burned; so that the Alcalde may order the premises, where the patient died, to be replastered and whitewashed, the floor scraped and the alcove where the bed was changed. * * * "

It is curious to note that we, who are certain to a far greater extent, as to the contagiousness of this disease, since our certainty is based on experimental proofs which the people of those days did not possess, do but a very small part of what they did.

TABLE 17.—*Restrictive and preventive measures in tuberculosis, in Michigan, in 1912.*

Restrictive and preventive measures.	Number of instances.	Per cent.
Disinfection of Sputa:		
Enforced	1,506	*65
Neglected	37	* 2
Not stated or statements doubtful	759	*33
Disinfection of Soiled Bedding, Clothing, etc.:		
Enforced	1,757	65
Neglected	33	1
Not stated or statements doubtful	903	34
Disinfection of Discharges from Bowels and Bladder:		
Enforced	86	†63
Neglected	5	† 4
Not stated or statements doubtful	46	†33
Disinfection of Rooms Occupied by Patients:		
Enforced	1,787	66
Neglected	19	1
Not stated or statements doubtful	887	33

*Disinfection of the sputa was not considered necessary in 291 instances, in which there was said to be no sputa, or in which the disease was said to be located only in the bowels, stomach, liver, etc., therefore this number has been deducted from the 2,693 deaths in 1912 before making the per cent.

†Disinfection of the bowel and bladder discharges was considered necessary in but 137 instances, i. e., where the disease was located solely, or in combination with some other organ, in the bowels, or in some other part of the body from which infection might leave the body by way of the bowels or bladder.

At what age do the majority of those whose death is caused by tuberculosis die? Is it in infancy, youth, manhood or old age? It makes a vast difference in the general and economic welfare of the community at what age so many deaths occur as those from tuberculosis. If in infancy or childhood, they are only potential factors in the community of workers; or if in old age, their contribution to the community has been made. Alas, tuberculosis claims its victims in the best years of their life, for it is a fact, as previously stated, that, in Michigan, 52 per cent of the deaths from this disease occurred between the ages of 20 and 40 years.

Consider for a moment, in terms of dollars and cents, the prodigious economic loss entailed upon the community by tuberculosis. In the United States it has been estimated that the money loss from tuberculosis is $1,235,000,000 a year; France, $200,000,000; in Canada, $72,000,000 and in New York City alone $23,000,000. England in fifteen years expended $600,000,000 in combating tuberculosis and has saved 876,581 lives thereby, or, in round numbers, $685 per life. Mr. Hoffman, statistician of the Prudential Life Insurance Company, says that the annual cost of deaths from tuberculosis to that company, on a basis of three years' experience, is $800,000.

The economic loss from this disease to the State of Michigan for 1912, based on valuations of life, at the various ages, as made by Prof. Irving Fischer, of Yale, is as follows:

Economic Loss to Michigan from Tuberculosis in 1912.

Age groups.	Value of life.	Deaths from tuberculosis.	Economic loss to Mich
0–5 years	$1,500	115	$172,500
5– 9 years	2,300	53	121,900
10–19 years	2,750	296	814,000
20–29 years	6,250	780	4,875,000
30–39 years	6,500	546	3,549,000
40–49 years	5,250	351	1,842,750
50–59 years	4,500	269	1,210,500
60–69 years	1,500	167	250,500
70–79 years	750	60	45,000
80 years and over	300	13	3,900
Total		2,650	$12,885,050

SUMMARY.

Summarizing the preceding tables we find:

(1.) That tuberculosis in Michigan is on the decrease.

(2.) That tuberculosis is less prevalent in Michigan than in other States of the Registration Area.

(3.) That tuberculosis is more prevalent among the colored population, in proportion to their numbers, than among the white.

(4.) That tuberculosis causes more deaths than all other communicable diseases combined, pneumonia excepted.

(5.) That tuberculosis is more prevalent in some divisions of the State than in others.
(6.) That tuberculosis is more prevalent in urban than in rural localities.
(7.) That tuberculosis is more fatal in some months than in others.
(8.) That tuberculosis is located in all parts of the body.
(9.) That age and sex have an influence in the prevalence of tuberculosis.
(10.) That tuberculosis is more prevalent among the males than females.
(11.) That certain occupations render persons more susceptible to tuberculosis than others.
(12.) That restrictive and preventive measures are factors in the prevention of the spread of this disease.
(13.) That tuberculosis entails an economic loss to the community and State.

TYPHOID FEVER IN MICHIGAN IN 1912 AND PRECEDING YEARS.

By Table 18 may be seen the general prevalence of typhoid fever in Michigan for each of the years, 1884-1912, inclusive:

This table has been divided into four groups for two reasons: First, the years previous to 1898 are grouped, because, as previously stated, the law providing for the compulsory reporting of deaths did not take effect until 1898, therefore those death rates are not comparable with those of following years. Second, after the year 1898, the cases and deaths are grouped into five-year periods and averaged, this being done to allow for better comparisons, for to compare the rate of one year with another is fallacious in determining the increase or decrease of the disease in the State, as conditions might be favorable to a low death rate in one year and unfavorable in another.

As may be seen by this table, the average death rate for the five years, 1903-1907, shows a decrease of 7.7 per cent compared with the previous five years, and that the average rate for the years 1908-1912, shows a decrease of 11.6 per cent compared with the average rate of 1903-1907, and a decrease of 18.5 per cent compared with the years 1898-1902.

In 1912, compared with the average death rate for the three years 1909-1911, typhoid fever decreased 18 per cent, or the saving of 116 lives from this disease in Michigan. This fact is obtained by multiplying the total population for the three years above mentioned by the death rate for 1912, which result is the number of deaths that would have occurred if the rate in those years had been the same as in 1912, then by subtracting this number of deaths from the number that actually occurred the result is, we find, a saving of 116 lives. By this same calculation, we find that had the same rate for 1912 existed during the years 1900-1911, there would have been a saving of 2,141 lives from typhoid fever in this State during those years.

The fatality rate (deaths per 100 cases) was, for the years 1898-1902, 20; 1903-1907, 23, and 1908-1912, 22. These figures should not be con-

strued as indicating the actual fatality rate, for, as we have good reason to believe, not all non-fatal cases of this disease, during any year, were reported to this Department.

TABLE 18.—*The prevalence of typhoid fever, in Michigan, in each of the twenty-nine years, 1884–1912.*

Years.	Cases.*	Deaths †	Deaths per 100,000 population.
1884	969	290	15.6
1885	715	194	10.2
1886	1,194	282	14.6
1887	3,424	411	20.8
1888	1,511	310	15.4
1889	2,530	681	33.2
1890	1,924	304	14.5
1891	4,670	697	32.7
1892	2,591	538	24.8
1893	3,512	594	26.9
1894	2,805	506	22.6
1895	3,751	621	27.3
1896	2,506	409	17.8
1897	1,900	352	15.1
Average, 1884–1897	2,429	422	21.0
1898	2,874	572	24.3
1899	3,194	580	24.3
1900	5,122	869	35.9
1901	3,002	645	26.3
1902	2,456	608	24.6
Average, 1898–1902	3,330	655	27.1
1903	2,840	606	24.2
1904	3,028	641	25.3
1905	2,774	636	24.9
1906	3,163	721	27.9
1907	1,953	594	22.7
Average, 1903–1907	2,752	640	25.0
1908	2,656	687	26.0
1909	2,694	653	24.5
1910	3,361	654	23.3
1911	2,660	551	19.3
1912	2,847	534	18.4
Average, 1908–1912	2,841	616	22.1

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.
†The law providing for the compulsory reporting of deaths, in this State, took effect in 1898.

GEOGRAPHICAL DISTRIBUTION OF TYPHOID FEVER.

As in pneumonia and tuberculosis, the State has been divided into eleven geographical divisions, to determine the relation between climatic conditions and typhoid fever.

By Table 19 it may be seen that, as compared with the average death rate for the State as a whole for the years 1891-1912, (25.8 per 100,000 population) the Upper Peninsular, Northwestern, Western and Northern Divisions had higher death rates.

The counties showing average death rates of 25 per cent or higher for the years 1891-1912, than the State, were: Baraga, Bay, Chippewa, Delta, Emmet, Gogebic, Grand Traverse, Ingham, Iron, Kent, Luce, Marquette, Menominee, Midland, Missaukee, Otsego, St. Clair and Wexford.

TABLE 19.—*The geographical distribution of typhoid fever, in Michigan, in the twenty-two years, 1891–1912, as indicated by the average number of cases and deaths, and in the average deaths per 100,000 persons living in each geographical division shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION	259,709	494	84.3	32.5
Alger county	5,406	3	1	18.5
Baraga county	5,053	19	2	39.6
Chippewa county	20,078	47	7	34.9
Delta county	24,907	40	13	52.2
Dickinson county	17,801	28	3	16.9
Gogebic county	17,262	65	7	40.6
Houghton county	63,617	70	13	20.4
Iron county	8,772	10	3	34.2
Keweenaw county	4,278	4	.6	14.0
Luce county	3,351	5	2	59.7
Mackinac county	8,051	4	.7	8.7
Marquette county	40,705	118	17	41.8
Menominee county	25,249	48	12	47.5
Ontonagon county	6,958	17	2	28.7
Schoolcraft county	8,221	16	1	12.2
NORTHWESTERN DIVISION	86,427	119	24	27.8
Benzie county	9,930	22	3	30.2
Grand Traverse county	21,474	40	7	32.6
Leelanau county	10,378	5	2	19.3
Manistee county	26,912	27	6	22.3
Wexford county	17,733	25	6	33.8
NORTHERN DIVISION	77,650	102	20.5	26.4
Antrim county	14,496	18	4	27.6
Charlevoix county	14,877	14	3	20.2
Cheboygan county	16,285	17	3	18.4
Crawford county	3,455	5	.5	14.5
Emmet county	15,309	24	5	32.7
Kalkaska county	6,971	10	2	28.7
Otsego county	6,257	14	3	47.9
NORTHEASTERN DIVISION	58,013	48	14 39	24.8
Alcona county	5,609	4	.7	12.5
Alpena county	19,275	14	6	31.1
Isoco county	11,085	8	3	27.1
Montmorency	3,214	2	.6	18.7
Ogemaw county	7,793	8	2	25.7
Oscoda county	1,913	3	.09	4.7
Presque Isle	9,124	9	2	21.9
WESTERN DIVISION	278,061	415	77	27.7
Kent county	136,821	294	46	33.6
Lake county	5,362	6	1	18.6
Mason county	19,743	20	6	30.4
Muskegon county	37,882	26	7	18.5
Newaygo county	18,865	18	5	26.5
Oceana county	17,542	22	4	22.8
Ottawa county	41,846	29	8	19.1

*Estimated for intercensal years.
†From many localities only the fatal cases were reported.

TABLE 19.—*Concluded.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
NORTHERN CENTRAL DIVISION	107,252	135	24.2	22.6
Clare county	8,823	11	2	22.7
Gladwin county	7,262	11	1	13.8
Isabella county	23,190	31	5	21.6
Mecosta county	24,973	21	5	20.0
Midland county	14,193	25	5	35.2
Missaukee county	9,198	18	3	32.5
Osceola county	17,856	16	3	16.8
Roscommon county	1,757	2	.2	11.4
BAY AND EASTERN DIVISION	344,492	386	87.8	25.5
Arenac county	8,916	6	.8	9.0
Bay county	64,017	59	21	32.8
Huron county	34,228	28	6	17.5
Lapeer county	27,567	30	6	21.8
Saginaw county	85,222	74	17	19.9
Sanilac county	34,508	45	9	26.0
St. Clair county	54,647	108	20	36.6
Tuscola county	35,387	36	8	22.6
CENTRAL DIVISION	319,391	422	80	25.0
Barry county	22,752	21	3	13.2
Clinton county	25,274	37	7	27.7
Eaton county	31,448	45	7	22.3
Genesee county	45,455	59	12	26.4
Gratiot county	29,679	42	8	27.0
Ingham county	43,956	94	16	36.4
Ionia county	34,675	39	8	23.1
Livingston county	19,130	22	4	20.9
Montcalm county	33,563	26	8	23.8
Shiawassee county	33,459	37	7	20.9
SOUTHWESTERN DIVISION	141,880	153	32	22 6
Allegan county	39,224	28	7	17.8
Berrien county	48,898	49	12	24.5
Cass county	20,546	23	4	19.5
Van Buren county	33,212	53	9	27.1
SOUTHERN CENTRAL DIVISION	322,828	378	67	20.8
Branch county	26,057	27	5	19.2
Calhoun county	51,848	67	13	25.1
Hillsdale county	29,933	25	5	16.7
Jackson county	47,965	78	12	25.0
Kalamazoo county	48,873	77	10	20.5
Lenawee county	48,727	56	11	22.6
St. Joseph county	24,277	19	4	16.5
Washtenaw county	45,148	29	7	15.5
SOUTHEASTERN DIVISION	488,148	349	124	25.4
Macomb county	32,763	37	8	24.4
Monroe county	33,076	37	8	24.2
Oakland county	45,247	36	9	19.9
Wayne county	377,062	239	99	26.3

*Estimated for intercensal years.
†From many localities only the fatal cases were reported.

TYPHOID FEVER IN URBAN AND RURAL LOCALITIES.

As may be seen by Table 20, typhoid fever is more prevalent in the urban than in the rural localities. In this respect, it does not differ from tuberculosis. But, unlike tuberculosis, typhoid fever does not seem to decrease in prevalency in the same relative proportion with the decrease in the density of population, as may be seen by comparing the

average death rates of those groups of cities comprising the urban localities. Another dissimilarity between the two diseases, above mentioned, is that tuberculosis showed a greater decrease in the urban localities in 1912, compared with the average years, than it did in the rural localities, while typhoid fever, by the same comparison, shows a decrease of 40.7 per cent in the rural and only 24.0 per cent in the urban. On the average, the prevalence of typhoid fever, as indicated by the death rates per 100,000 population, is 38.6 per cent less in the rural localities.

In Table 20A is shown those cities and villages comprising the first four groups of Table 20, together with their death rates from typhoid fever in 1912 and their average rate for the years 1904-1911.

By this table it can be determined whether the disease is increasing or decreasing in any of those cities by comparing the current year with the average, also enabling one to compare the rate of one city with that of another.

In 1912, the cities having a death rate of 25 per cent or higher than the State as a whole for that year (18.4) were: Alpena, Bay City, Boyne City, Escanaba, Flint, Grand Rapids, Kalamazoo, Ludington, Marquette, Mt. Clemens, Pontiac, Port Huron and Wyandotte.

TABLE 20.—*The prevalence of typhoid fever in urban and rural localities, in Michigan, as indicated by the death rates per 100,000 population in the several groups, for each of the years, 1904–1912.*

Localities—Grouped according to density of population.	Deaths per 100,000 population.									
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Average 1904–1911.	1912.
Cities over 50,000	30.5	29.1	30.4	31.5	27.7	25.5	23.5	20.2	26.7	21.5
Cities from 25,000 to 50,000	42.5	32.5	41.5	26.7	42.5	28.5	46.4	22.7	35.0	29.4
Cities from 10,000 to 25,000 and Calumet township	49.5	36.1	47.8	42.3	44.6	53.1	37.1	36.5	43.4	41.9
Cities and villages from 5,000 to 10,000	27.9	29.1	26.8	28.4	32.8	31.2	36.6	21.7	29.5	14.3
Cities and villages under 5,000	32.7	26.9	29.8	25.7	27.4	28.6	20.4	24.1	26.9	16.8
Total urban	35.8	30.2	34.3	31.1	32.4	31.6	28.9	23.9	30.8	23.4
Rural localities (townships)*	21.0	21.0	25.9	17.4	22.1	19.3	17.8	14.8	18.9	11.2

*Exclusive of Calumet township, which, for the purpose of this study, is included in third group of urban localities which have corresponding populations.

TABLE 20A.—*The prevalence of typhoid fever in 1912, and preceding years, in each of the principal localities included in the first four groups in Table 20.*

Localities.	1912.				Average, 1904–1911.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	10,791	1	0	.....	11,184	†6	3	26.8
Albion	6,130	7	0	.....	5,383	5	6	11.1
Alpena	12,808	7	8	62.5	12,763	‡17	7	54.8
Ann Arbor	14,890	5	2	13.4	14,699	10	3	20.4
Battle Creek	26,285	45	6	22.8	24,751	38	8	32.3
Bay City	46,674	45	31	66.4	41,817	§	18	43.0
Benton Harbor	10,013	10	2	20.0	7,440	9	2	26.9
Boyne City	6,140	7	2	32.6	3,924	3	.9	23.0
Cadillac	8,869	3	1	11.3	7,714	19	4	51.9
Calumet Township	21,079	1	1	4.7	18,548	17	2	10.8
Cheboygan	6,902	0	0	.....	6,878	5	1	14.5
Coldwater	5,852	1	1	17.1	6,154	5	.5	8.1
Detroit	515,158	420	90	17.5	376,881	‡328	90	23.9
Dowagiac	5,316	2	0	.....	4,707	10	2	42.5
Escanaba	13,893	5	5	36.0	12,392	§	20	161.4
Flint	46,439	65	12	25.8	22,129	96	13	58.8
Grand Haven	6,062	3	1	16.5	5,639	3	1	17.7
Grand Rapids	118,189	344	41	34.7	104,104	326	38	36.5
Hancock	9,962	3	2	20.0	7,768	§	4	51.5
Hillsdale	5,065	2	1	19.7	5,170	10	2	38.7
Holland	10,998	1	1	9.1	9,930	7	1	10.1
Houghton	5,369	0	0	.....	5,016	§	.4	8.0
Iron Mountain	9,426	1	0	.....	8,448	§	1	11.9
Ironwood	13,755	1	0	.....	10,925	§	5	45.8
Ishpeming	12,723	1	2	15.7	11,082	6	2	18.0
Jackson	33,477	55	6	17.9	27,017	69	9	33.3
Kalamazoo	42,655	47	10	23.4	34,918	64	9	25.8
Lansing	34,880	78	7	20.1	25,020	¶61	11	44.0
Laurium	8,831	0	0	.....	8,836	§	2	22.6
Ludington	9,756	50	5	51.3	7,810	¶13	3	38.4

See foot notes on following page.

TABLE 20A.—*Concluded.*

Localities.	1912.				Average, 1904-1912.			
	Population.	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Manistee	12,272	5	0	.....	11,892	15	3	25.2
Marquette	11,782	127	13	110.3	11,177	19	7	62.6
Menominee	10,311	6	2	19.4	10,130	‡23	9	88.8
Monroe	7,148	2	1	14.0	6,844	6	1	14.6
Mt. Clemens	7,907	9	2	25.3	7,520	§	4	53.2
Muskegon	25,117	6	3	11.9	21,792	23	5	22.9
Negaunee	9,014	6	1	11.1	7,183	18	3	41.8
Niles	5,328	9	1	18.8	4,947	7	.8	16.2
Owosso	9,804	0	0	.....	9,489	5	2	21.1
Pontiac	15,748	40	8	50.8	12,395	‡55	4	32.3
Port Huron	18,475	242	40	216.5	20,121	30	9	44.7
Saginaw	51,810	121	16	30.9	49,686	49	15	30.2
St. Joseph	6,141	0	0	.....	5,567	§	2	35.9
Sault Ste. Marie	13,006	12	3	23.1	12,184	23	6	49.2
Three Rivers	5,458	0	0	.....	4,397	2	.1	2.3
Traverse City	12,408	27	3	24.2	12,377	48	5	40.4
Wyandotte	9,241	62	5	54.1	6,314	‖30	6	95.0
Ypsilanti	5,778	2	0	.....	7,318	†6	1	13 7

*Estimated for intercensal years.
†6 year average.
‡2 year average.
§Fatal cases only reported.
¶7 year average.
‖4 year average.

INFLUENCE OF AGE AND SEX IN TYPHOID FEVER.

What has previously been stated regarding the influence of age and sex in pneumonia and tuberculosis, applies with equal force to typhoid fever—that age and sex have an effect on the death rate of these diseases. For the purpose of showing this fact in typhoid fever, a number of tables have been compiled pertaining to the State and certain cities, in 1912, and dealing with the subject from various angles.

Table 21, in dealing with this phase of the study for 1912, shows the following: First, the per cent of the population living at specified ages to the total population of the State, and showing the same for each sex. Second, the per cent of deaths from typhoid fever at specified ages to the total deaths from this disease, and the same for each sex. Third, the death rates per 100,000 of the population at specified ages and for each sex. Fourth, the per cent of excess of death rates of males over that of females.

In order to determine the influence of age and sex from the figures shown in this table, the following example is noted:

As will be seen by the Table the population under 5 years of age constituted 10.7 per cent of the total population of the State, while, at the ages 20-24, their population was 9.5 per cent of the total or 11.2 per cent less than the per cent that the persons living under 5 years of age bore to the total population. The per cent of deaths from typhoid fever under 5 years of age was 5.6 per cent of the total deaths from this disease and 16.3 per cent of the total deaths from typhoid fever occurred among persons aged from 20-24, or, the per cent of deaths of those whose ages were from 20-24 years, contributed a per cent that was 208 per cent in excess of that of those persons whose ages were under 5 years.

Thus, we find that, while the per cent of the population to the total population of those living under 5 years of age is 11.2 per cent greater than that of those whose ages are from 20-24, the per cent of deaths to the total deaths from typhoid fever of those whose ages are from 20-24 was 208 per cent higher than that of those under 5 years of age. This example, therefore, proves that those living at certain ages are more susceptible to this disease than at others.

By this same table it may be seen that typhoid fever, in 1912 at least, was more prevalent among the males than females, as indicated by their death rates. At the ages under 5 years, it is shown that the death rate of the males was 86 per cent in excess of that of females and that at all ages the rate of the males was 44 per cent higher than the rate for the females. Or, in other language, at the ages under 5 years, to every 100 deaths occurring among the females there were 186 among the males; and at all ages to every 100 deaths among the females there were 144 among the males. That the relative mortality of the two sexes varies with age is also shown in the table.

While the figures contained in Table 21 tell us that the greatest number of deaths from typhoid fever, in 1912, are contributed by persons whose ages range from 15-30 years, still, they tell us nothing of the

power of resistance to death from this disease, at the various ages, which is indicated by the number of deaths per 100 persons attacked. These facts are shown in Table 21A.

The statements made previously regarding the fatality rate (deaths per 100 cases) in pneumonia, will apply equally to typhoid fever—that while all non-fatal cases of typhoid fever are not reported, still it is fair to compare the fatality rate of one age group with that of another.

By this table, it may be seen that the greatest number of persons attacked were those persons whose ages range from 15 to 30 years, which was also true of the deaths, but the fatality rate, with the exception of those whose ages ranged from 5 to 15 years, was the lowest at these ages than that of any of the other age groups; thus showing that, while those persons whose ages range from 15 to 30 years contribute the largest number of cases and deaths from this disease than of any of the other age groups, still, with the exception noted above, those persons taken sick from this disease are less liable to succumb than at any of the other ages. By this table it would seem that, of those taken sick, the older the persons the greater are their possibilities of dying from typhoid fever.

In the cities of Marquette and Port Huron, there occurred, in 1912, outbreaks of typhoid fever, causing in Marquette 127 cases, including 13 deaths; and, Port Huron, 231 cases, including 40 deaths. To allow those who might be interested in studying the fatality of typhoid fever in these cities, compared with the State, Tables 21B, 21C and 21D, have been prepared.

TABLE 21.—*Influence of age and sex in typhoid fever as indicated by the per cent of population of those living at each age group to the total population of each sex; the per cent of deaths from typhoid fever at each age group to the total deaths of each sex and the deaths per 100,000 persons living at the same age and sex, in Michigan, in 1912.*

Age groups.	Per cent of population at specified ages to the total of each sex.			Per cent of deaths from typhoid fever at specified ages to the total of each sex.			Deaths from typhoid fever per 100,000 population of same age and sex.			Percentage of excess of death rates, among males
	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	
Under 1 year	2.2	2.1	2.2	.....	.....	.....	.....	.....	.....	.....
1 year	2.0	2.0	2.1	1.3	1.9	.5	11.8	20.1	3.4	491
2 years	2.2	2.1	2.2	1.0	.9	1.0	7.9	9.3	6.5	43
3 years	2.2	2.1	2.2	2.3	2.5	1.9	19.2	25.2	13.0	94
4 years	2.1	2.1	2.2	1.0	.6	1.5	8.1	6.5	9.9	—52
Under 5 years	10.7	10.4	10.9	5.6	6.0	4.9	9.4	12.1	6.5	86
5 to 9 years	9.6	9.4	9.8	4.6	2.5	7.8	8.6	5.7	11.6	—104
10 to 14 years	8.8	8.6	9.8	4.8	2.8	7.8	9.7	7.0	12.6	—80
15 to 19 years	9.4	9.3	9.6	14.4	13.2	16.1	27.4	30.1	24.6	22
20 to 24 years	9.5	9.5	9.5	16.3	16.7	15.6	30.8	37.0	24.1	12
25 to 29 years	8.7	8.8	8.5	10.9	12.3	8.8	22.7	29.3	15.2	93
30 to 34 years	7.6	7.7	7.5	9.8	10.7	8.3	23.1	29.4	16.2	81
35 to 39 years	6.8	6.9	6.8	9.6	11.4	6.9	25.2	34.6	14.8	134
40 to 44 years	6.1	6.1	6.0	5.6	6.6	3.9	16.5	22.8	9.6	138
45 to 49 years	5.4	5.5	5.3	5.4	5.0	5.9	17.8	19.2	16.2	18
50 to 54 years	5.0	5.1	4.8	4.6	5.1	3.9	16.7	20.8	12.0	73
55 to 59 years	3.7	3.9	3.1	2.9	2.8	2.9	13.9	15.4	12.1	27
60 to 64 years	3.0	3.0	2.9	2.5	2.5	2.4	15.1	17.5	12.3	42
65 to 69 years	2.4	2.5	2.4	1.7	.6	3.4	12.8	5.4	21.1	—291
70 to 74 years	1.6	1.6	1.6	1.3	1.6	1.0	15.4	21.1	9.1	132
75 to 79 years	1.0	1.0	1.0	.4	.....	1.0	7.0	.....	14.4	.....
80 years and over	.7	.7	.7	.....	.....	.....	.....	.....	.....	.....
All known ages	100.0	100.0	100.0	100.0	100.0	100.0	18.0	21.1	14.7	44

NOTE.—Per cent of excess of death rates of females.

TABLE 21A.—*The influence of age and sex in typhoid fever, as indicated by the number of cases and deaths, of those persons whose ages were known, that occurred at the various age groups and of each sex, in Michigan, in 1912.*

Age groups.	Number of persons attacked.			Number of deaths.			Percentage fatality.			Ratio of number of cases to deaths.		
	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males	Females.
Under 5 years	140	85	55	28	19	9	20.0	22.4	16.4	5.0	4.5	6.1
5 to 9 years	310	148	162	25	8	17	8.1	5.4	10.5	12.4	18.5	9.5
10 to 14 years	294	158	136	26	9	17	8.8	5.7	12.5	11.3	17.6	8.0
15 to 19 years	391	192	199	76	42	34	19.4	21.9	17.1	5.1	4.6	5.9
20 to 24 years	435	249	186	85	52	33	19.5	20.9	17.7	5.1	4.8	5.6
25 to 29 years	307	186	121	60	38	22	19.5	20.4	18.2	5.1	4.9	5.5
30 to 34 years	238	140	98	51	34	17	21.4	24 3	17.3	4.7	4.1	5.8
35 to 39 years	187	132	55	51	36	15	27.3	27.3	27.3	3.7	3.7	3.7
40 to 44 years	123	85	38	29	22	7	23.6	24.7	18.4	4.2	3.9	5.4
45 to 49 years	92	50	42	25	14	11	27.2	28.0	26.0	3.7	3.6	3.8
50 to 54 years	68	42	26	25	16	9	36.8	38.1	34.6	2.7	2.6	2.9
55 to 59 years	53	31	22	16	9	7	30.2	29.0	31.8	3.3	3.4.	3.1
60 years and upwards	53	21	32	30	14	16	56.6	66.7	50.0	1.8	1.5	2.0
Total	2,691	1,519	1,172	527	313	214	19 6	20.6	18.3	5.1	4.9	5.5

TABLE 21B.—*The influence of age and sex in the outbreak of typhoid fever that occurred in the city of Marquette in 1912, as indicated by the number of cases and deaths, among those persons of known ages, that occurred at the various age groups and of each sex.*

Age groups.	Number of persons attacked.			Number of deaths.			Percentage fatality.			Ratio of number of cases to deaths.		
	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.
Under 5 years	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5 to 9 years	11	4	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
10 to 14 years	14	7	7	.....	.....	.....	.....	.....	.....	.....	.....	.....
15 to 19 years	17	7	10	2	1	1	11.8	14.3	10.0	8.5	7.0	10.0
20 to 24 years	20	10	10	1	1	.....	5.0	10.0	.....	20.0	10.0	.....
25 to 29 years	16	12	4	2	1	1	12.5	8.3	25.0	8.0	12.0	4.0
30 to 34 years	18	14	4	3	3	.....	16.7	21.4	.....	6.0	4.7	.....
35 to 39 years	11	6	5	1	1	.....	9.1	16.7	.....	11.0	6.0	.....
40 to 44 years	9	8	1	1	1	.....	11.1	12.5	.....	9.0	8.0	.....
45 to 49 years	3	3	.....	1	1	.....	33.3	33.3	.....	3.0	3.0	.....
50 to 54 years	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
55 to 59 years	3	3	.....	1	1	.....	33.3	33.3	.....	3.0	3.0	.....
60 years and upwards	2	2	.....	1	1	.....	50.0	50.0	.....	2.0	2.0	.....
Total	127	78	49	13	11	2	10.2	14.1	4.1	9.8	7.1	24.5

TABLE 21C.—*The influence of age and sex in the outbreak of typhoid fever that occurred in the city of Port Huron in 1912, as indicated by the number of cases and deaths, among those persons of known ages, that occurred at the various age groups and of each sex.*

Age groups.	Number of persons attacked.			Number of deaths.			Percentage fatality.			Ratio of number of cases to deaths.		
	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.
Under 5 years	12	7	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
5 to 9 years	33	12	21	2	.....	2	6.1	.....	9.5	16.5	.....	10.5
10 to 14 years	25	12	13	5	2	3	25.0	16.7	23.3	5.0	6.0	4.3
15 to 19 years	52	28	24	6	4	2	11.5	14.3	8.3	8.7	7.0	12.0
20 to 24 years	36	19	17	6	2	4	16.7	10.5	23.5	6.0	9.5	4.3
25 to 29 years	18	10	8	5	2	3	27.8	20.0	37.5	3.6	5.0	2.7
30 to 34 years	26	17	9	5	5	.....	20.0	29.4	.....	5.2	3.4	.....
35 to 39 years	10	7	3	3	3	.....	30.0	42.9	.....	3.3	2.3	.....
40 to 44 years	5	4	1	2	2	.....	40.0	50.0	.....	2.5	2.0	.....
45 to 49 years	6	2	4	2	1	1	33.3	50.0	25.0	3.0	2.0	4.0
50 to 54 years	3	1	2	2	1	1	66.7	100.0	50.0	1.5	1.0	2.0
55 to 59 years	4	3	1	1	1	.....	25.0	33.3	.....	4.0	3.0	.....
60 years and upwards	1	.....	1	1	.....	1	100.0	.....	100.0	1.0	.....	1.0
Total	231	122	109	40	23	17	17.3	18.9	15.6	5.8	5.3	6.4

TABLE 21D.—*The average ages of typhoid fever patients in Michigan, Marquette and Port Huron, in 1912.*

Sex.	Michigan.	Marquette.	Port Huron.
Males:			
Average age of males who recovered	23.2	27.0	19.9
Average age of males who died	29.8	36.9	30.0
Average age of all males who died or recovered	24.6	28.3	21.8
Females:			
Average age of females who recovered	21.8	21.1	19.4
Average age of females who died	28.7	22.2	25.1
Average age of all females who died or recovered	23.1	21.1	20.3
Both sexes:			
Average age of all persons who recovered	22.6	24.5	19.6
Average age of all persons who died	29.4	34.6	27.8
Average age of all persons who died or recovered	23.9	25.6	21.1

That the age distribution of populations should be taken into consideration in comparing the death rates of two localities or groups of localities, is borne out by the preceding tables. For instance, we find that those persons whose ages range from 15 to 40 years, have higher death rates from typhoid fever than at other age groups. So that if the population of a locality, with which a comparison is being made, has a higher proportion of persons living at the above mentioned ages than the population of the locality in question, then that fact would naturally give the latter population a proportionately lower rate.

SEASONAL PREVALENCE OF TYPHOID FEVER.

The normal seasonal distribution of typhoid fever in Michigan is shown in Table 22. June is the month in which the disease is usually least prevalent. During the summer it increases gradually until it attains a maximum in October, when it gradually decreases, though with some slight fluctuations with the winter and spring months.

Many theories have been advanced to account for the greater general prevalence of typhoid fever in the autumn than other seasons of the year. That it is in some way related to temperature can scarcely be questioned, as is shown by the diagram following Table 22. In order to better show the correspondence between temperature and typhoid fever the typhoid fever curve should be set back two months, thus allowing for the period elapsing between the date of infection and the date of death. Sedgwick and Winslow explain the correspondence between temperature and typhoid fever by the general unfavorable influence which cold exerts on the persistence of the typhoid bacillus outside the body. It is held that during warm weather transmission by contact is more frequent, and infection by other methods rendered more likely by reason of the increased longevity of the bacilli.

Other reasons for the greater prevalence of typhoid fever in warm weather are that flies and other insects are more abundant and more active in summer; bacteria multiply faster in milk, fruits, berries and uncooked foods are more commonly used; more water is drunk; wells are lower, and the danger of contamination is thereby increased.

TABLE 22.—*The seasonal prevalence of typhoid fever in Michigan, as indicated by the average number of deaths from this disease in each month during the fifteen years, 1898–1912.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec
Average number of deaths.	43	38	41	38	35	27	34	53	84	100	78	55

REPORTED SOURCES OF CONTAGIUM IN TYPHOID FEVER.

To state with any degree of exactness the proportion of cases of typhoid fever due to different causes, is absolutely impossible from such data as we have at hand. By Table 23 it will be seen that the source of contagium was said to have been traced in only 31.9 per cent of the total cases reported during the years 1891-1912, and, undoubtedly, in a large per cent of these instances, the reply, as to the source of contagium, was based upon circumstantial evidence.

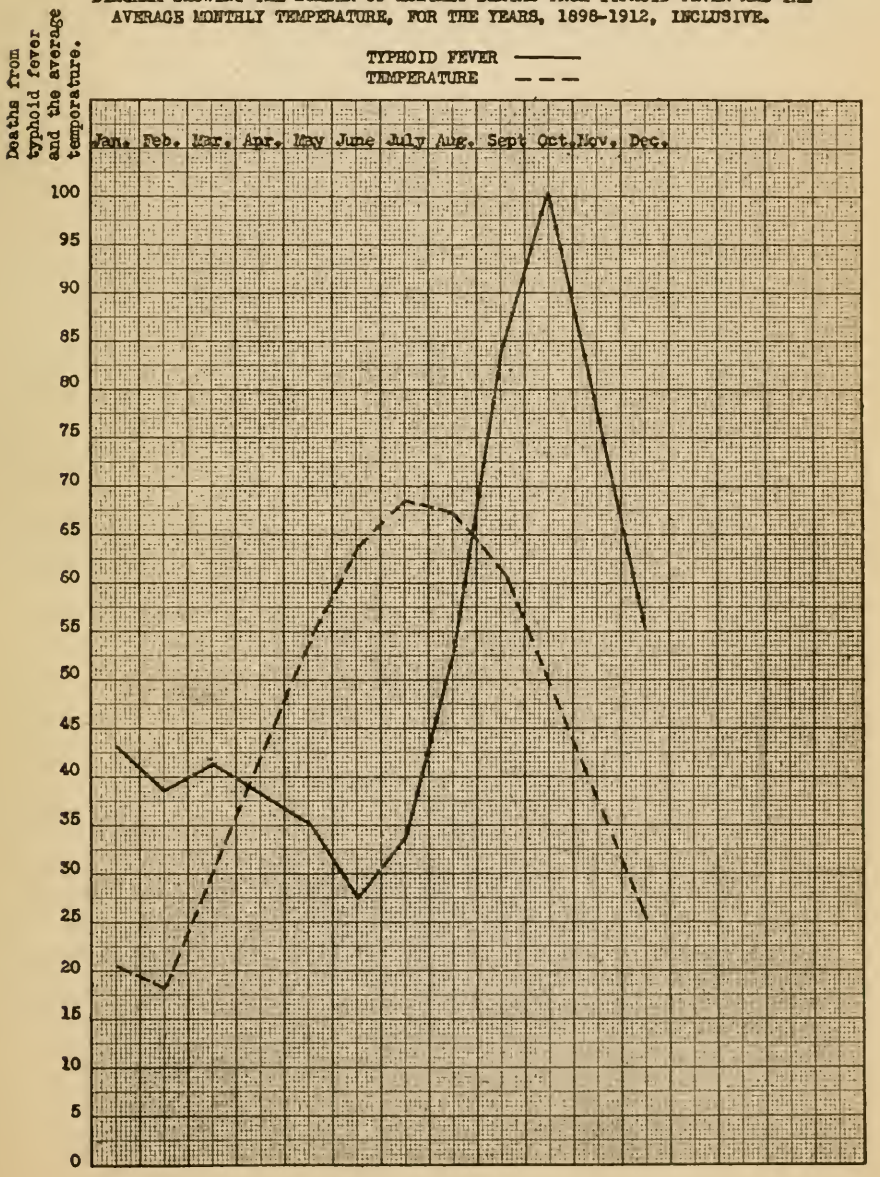
Of the cases of typhoid fever in which a source of contagium was given, 56 per cent were said to have been due to water and ice. This number, especially those cases due to water, would undoubtedly be very much greater if all the cases had been traced to their source.

The comparatively large number of cases in which the infection was traced to outside jurisdictions included principally, those cases in which the persons were taken sick in a camp, or other places away from home, and were removed to their homes or to a hospital, in other health jurisdictions, to be cared for. The removal, from one locality to another, of a person suffering from typhoid fever is a dangerous practice, and is unlawful, unless the same is done with the consent and under the supervision of the health officials of the locality to which the person is to be removed.

The 2,991 cases which were said to be due to coming in contact with or nursing typhoid fever patients were due, in the main, to the neglect of proper precautions on the part of those in attendance upon the sick persons. Where the utmost care and cleanliness is observed by those in care of typhoid fever patients, cases due to secondary infection should be of rare occurrence. It often happens, however, that the nursing is done by some member of the family, who may also handle food, or assist in the preparation of meals, to be eaten by herself and other members of the family; and the hands may not always be disinfected and cleansed between the act of caring for the patient and the handling of the food. It is also probable that many cases of typhoid fever which occurred in the same household, camp, etc., and which were reported as due to secondary infection, were really due to the same source as the original case, or to the primary infection.

While Table 23 shows that but comparatively few cases had their source of contagium traced to infected milk and to flies, still those two sources are, undoubtedly, the cause of a large per cent of the cases of typhoid fever. In this connection, George C. Whipple in his article on "Typhoid Fever" says: "When a contaminated water supply is suddenly improved in quality by the installation of a filter plant, there is nearly always a decided fall in the typhoid fever death rate. Cities which have

pure water have a generally lower death rate than those which have an impure supply. These differences may serve as a rough measure of the amount of typhoid fever due to impure public water supplies. The average typhoid death rate in American cities is about 35 per 100,000. The cities in the north which have safe water supplies have lower rates,—usually as low as 20, and frequently as low as 15 or even 10. Taking the



country over, perhaps 20 may be taken as an average figure. The difference between 20 and 35 may be considered, therefore, as being due to infected water supplies. Of the 'residual typhoid,' the most potent causes are probably infected milk, and direct infection by contagion, by flies, etc. Oysters, vegetables and other foods really play a very insignificant part in the general typhoid death rate."

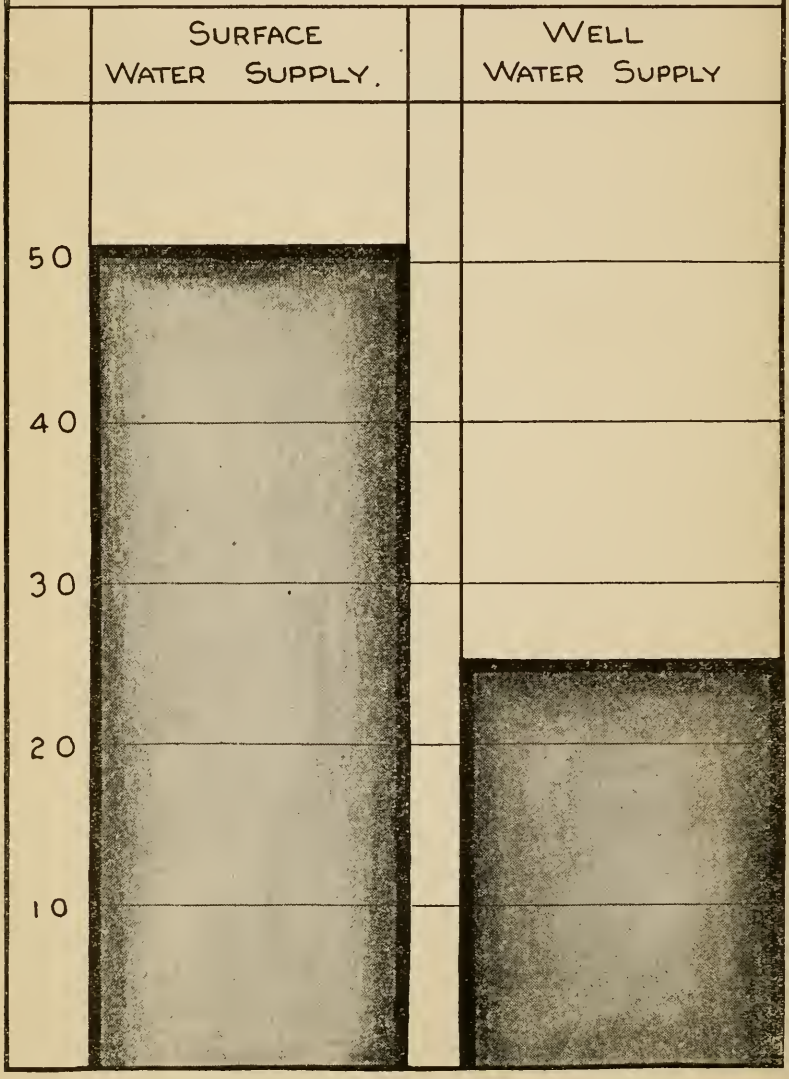
In confirmation of Mr. Whipple's statement that the general death rate, as well as the rate from typhoid fever, is usually higher in those cities having impure water supplies than those having pure, the following table and diagram have been prepared:

Table showing the average annual death rate per 100,000 population from all causes and from typhoid fever in cities of Michigan of 5,000 inhabitants and over for the years 1904–1910, inclusive. Cities grouped according to source of water supply (surface or wells) for the purpose of showing the effect of a public water supply on the general mortality and from typhoid fever.

Localities.	Source of water supply.	Deaths per 100,000 population from—	
		All causes.	Typhoid fever.
Mean annual death rate, 41 cities		1517.0	39.8
Alpena	Bay	1458.3	45.9
Battle Creek	Lake	1472.4	36.6
Bay City	Bay	1378.6	40.9
Cadillac	Lake	1431.5	50.9
Detroit	River	1634.0	25.0
Escanaba	Bay	1848.3	179.9
Flint	River	1597.4	72.8
Grand Rapids	River	1407.5	38.2
Hancock	Lake	1813.7	47.5
Ironwood	River	1445.1	49.9
Ishpeming	Lake	1557.9	15.8
Ludington	Lake	1476.4	32.1
Marquette	Lake	1622.7	56.6
Menominee	Bay	1519.2	93.4
Monroe	Lake	1190.0	14.7
Muskegon	Lake	1300.2	23.4
Negaunee	Lake	1524.9	49.3
Port Huron	River	1326.8	44.3
Saginaw	River	1360.6	30.6
St. Joseph	Lake	1506.7	36.4
Sault Ste. Marie	Lake	1438.7	47.3
Traverse City	Bay	*1952.5	44.0
Wyandotte	River	2100.8	105.4
Mean annual death rate, 23 cities		1537.6	51.3
Adrian	Well	1386.4	22.9
Ann Arbor	Well	†1857.1	18.5
Benton Harbor	Well	1516.4	24.0
Cheboygan	Well	1435.3	14.5
Coldwater	Well	1574.0	9.2
Grand Haven	Well	1218.4	15.3
Holland	Well	1160.2	10.2
Ionia	Well	1452.8	41.2
Iron Mountain	Well	1448.6	12.0
Jackson	Well	1620.7	33.8
Kalamazoo	Well	*1813.3	26.8
Lansing	Well	1251.3	47.3
Manistee	Well	1270.4	27.8
Mt. Clemens	Well	1810.9	43.9
Owosso	Well	1225.2	24.2
Petoskey	Well	1472.3	36.6
Pontiac	Well	*1990.0	30.9
Ypsilanti	Well	1326.7	13.3
Mean annual death rate, 18 cities		1490.6	25.1

*Insane hospitals are located in these cities.
†University of Michigan Hospital located in this city.

MEAN ANNUAL DEATH RATE FROM TYPHOID FEVER PER 100,000 POPULATION IN CITIES OF MICHIGAN OF 5,000 INHABITANTS AND OVER FOR THE YEARS 1904-1910 INCLUSIVE, CITIES GROUPED ACCORDING TO WATER SUPPLY (SURFACE OR WELL).



While it is not presumed, in making the comparisons shown in the foregoing table, that the water supply of all those cities whose water is obtained from surface sources is contaminated nor is it presumed that the water supply of all those cities obtaining their water from wells is free from contamination, still, as will be seen by this table, the general death rates and the death rates from typhoid are lower in those cities that obtain their water supply from wells than in those cities whose water supply is obtained from surface sources.

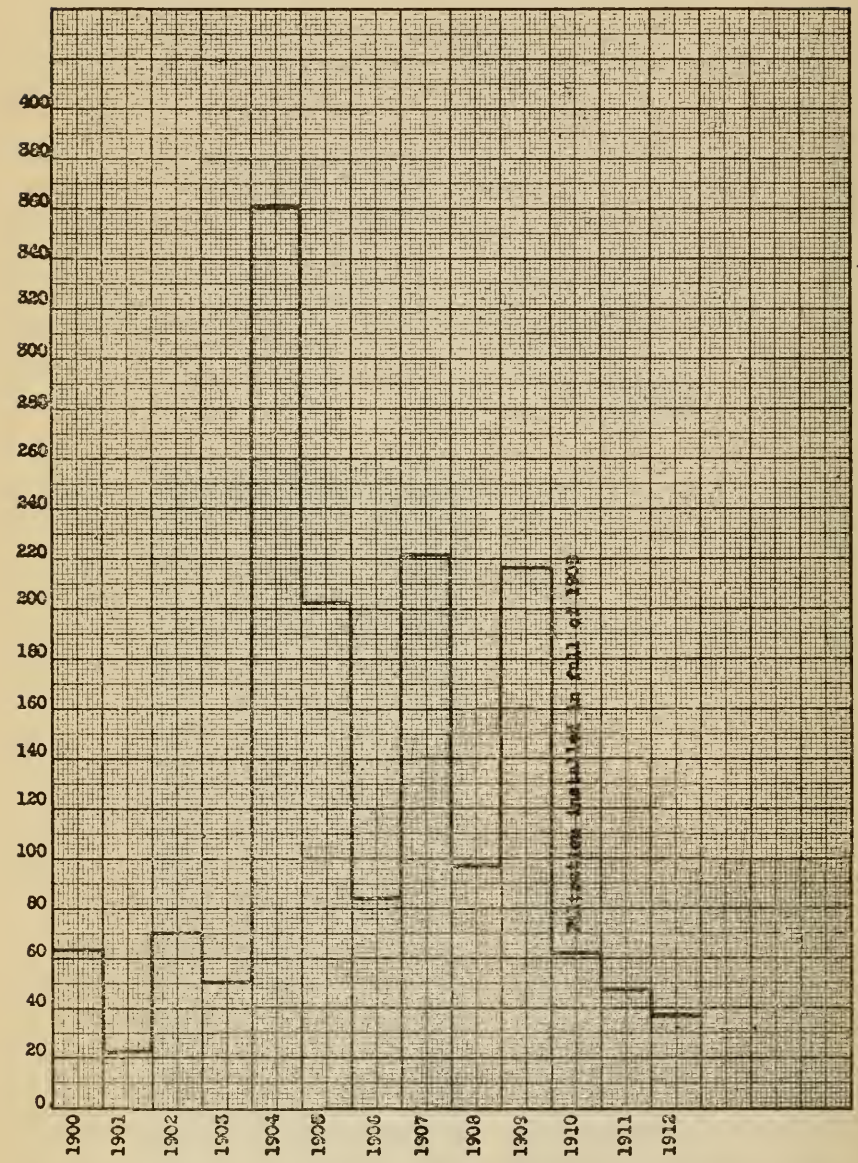
Referring to that part of the above quotation in which Mr. Whipple states that cities having a contaminated water supply and which is suddenly improved in quality by the installation of a filter plant, and thereby reducing the typhoid fever death rate, it is in no way better proven than by the typhoid fever history of Escanaba. As will be seen by the following table and diagram, illustrating the table, that, from 1904-1909 inclusive, the death rate from typhoid fever in this city was extraordinarily high. In the fall of 1909 a filtration plant was installed, by which the very impure water of former years was made practically pure. The typhoid death rate immediately dropped in 1910, and has since shown a greater decrease.

Table showing the death rates per 100,000 population from typhoid fever in the city of Escanaba for each of the years, 1900–1912.

Years.	Deaths per 100,000 population.
1900	62.8
1901	20.1
1902	67.8
1903	37.3
1904	360.4
1905	200.3
1906	84.2
1907	220.2
1908	94.9
1909	214.8
1910	60.7
1911	44.3
1912	36.0

While, as previously stated, water and ice were said to be the cause of 56 per cent of the cases of typhoid fever that were traced to a source during the years 1891-1912, it is probable that the ice was a cause of but a small proportion of these cases. Ice, even though formed over polluted water, retains, after a few hours, but a small per cent of the original bacteria contained in the water. This statement is based upon laboratory experiments, which show that the longevity of the typhoid bacillus decreases gradually as the freezing temperature is reached. Sedgwick and Winslow have shown that the mortality of the typhoid bacillus has been reduced 90 per cent in 24 hours and 99 per cent in two weeks. Therefore, ice cut in January may be used in July with only one per cent of the chance of danger that would be had by using the ice when freshly cut. In natural ice, it has been found that 90 per

DIAGRAM SHOWING THE TYPHOID FEVER DEATH RATES PER 100,000 POPULATION FOR THE THIRTEEN YEARS, 1900-1912 IN THE CITY OF ESCANABA.



cent of the bacteria in the original are excluded through the process of freezing; that is, the ice which forms over a polluted water is only 10 per cent as impure as the water itself. Whipple says: "The combined effect of the mechanical elimination of impurities by freezing and the

death of the bacteria during storage between winter and summer tends to reduce the practical danger of ice infection to an almost negligible quantity, providing the ice is properly harvested and stored." Where the greatest danger from ice is found, whether it be of the natural or artificial kind, is in the handling during distribution; and, undoubtedly, those cases noted in Table 23 that were said to have had their origin from ice, was ice that was contaminated during the process of delivery, instead of ice that was thought to be impure by reason of its having formed over water that was thought to be polluted. During the distribution of ice, it is walked over in the ice-houses, peddled through dusty streets, left on the sidewalk or floor, handled by servants, carted around in railroad stations, and dumped by laborers with dirty hands directly into drinking water tanks, and in many other ways subjected to the chances of infection.

TABLE 23.—*The principal reported sources of contagium in 21,046 cases of typhoid fever, in Michigan, in the twenty-two years, 1891-1912.*

Reported sources.	Number of cases.	Per cent of cases in which the source was known.
Water and ice	11,774	55.9
Outside jurisdictions	4,367	20.7
Traced to a former case in the same locality	2,991	14.2
Insanitary surroundings, defective sewerage, filth, etc	1,469	7.0
Milk and other foods	327	1.6
Flies	89	.4
Infected houses, articles of clothing, etc	29	.1
Sources not stated or doubtful	44,930	*68.1

*Per cent of all cases that were reported.

RESTRICTIVE AND PREVENTIVE MEASURES IN TYPHOID FEVER.

Table 24 indicates that, in 1912, compared with the average for the years, 1905-1911, the restrictive and preventive measures were carried out in a larger per cent of the cases.

Placarding of the premises where persons are sick with typhoid fever, a measure, perhaps, not so important in the prevention of the spread of typhoid fever as the others, although playing a certain part, was carried out in 71 per cent of the cases in 1912, compared with the average years of 63 per cent.

Isolation of the sick persons is a very important measure in the restriction of this disease, and, judging by the per cent of instances in which the measure was enforced in 1912, (87 per cent), compared with former years, (79 per cent), the necessity for this restrictive measure is quite generally recognized.

Disinfection of the discharges from the bowels and bladder, in cases of typhoid fever, is as important a restrictive measure, in this disease, as the disinfection of the sputa is in pulmonary tuberculosis; in fact, the disinfection of the discharges from the bowels and bladder is the

all important restrictive measure in this disease, because, if they are properly cared for, then the other preventive measures become practically unnecessary, as the enforcement of the balance of the restrictive measures depend upon how efficiently the discharges were taken care of. As may be seen by Table 24, they were disinfected in 88 per cent of the cases, in 1912, compared with 84 in former years.

The disinfection of infectious matter from typhoid patients is not at all difficult. The chemicals required are inexpensive, and are easily and safely manipulated. The disinfectants, however, should be used in large quantities and should be given time enough to act. Various kinds of disinfectants have been recommended,—chloride of lime, corrosive sublimate, carbolic acid, formaldehyde, copperas, blue vitriol, and others —all of which have certain special advantages in different cases; but for common practical use, in the disinfection of fecal matter, urine or sputa, or for use in the privy vaults or cesspools, no better substance can be recommended than slaked lime freely used. It is cheap; has no odor; white in color, and there should be no fear in handling it.

In the disinfection of the bowel discharges, especial attention should be given the feces in the earlier stages of the disease, and to the urine in the latter stages. Even after convalescence the urine should be disinfected for several weeks, or until a bacteriological examination has shown it to be unnecessary.

As may be seen by Table 24, the disinfection of the clothing and other articles soiled by the discharges above mentioned, was carried out in 88 per cent of the cases in 1912, which shows a slight improvement over that of former years.

Bedding and clothing soiled by the patient should be soaked for several hours in a solution of carbolic acid or bichloride of mercury, and afterwards washed in boiling water. Handkerchiefs should be similarly treated, though, preferably, inexpensive cloths should be used for the sputa and afterwards burned. Spoons, cups, and other articles handled by the patient should be soaked in disinfectants before washing, or boiling is a convenient way to sterilize these articles. As a further precaution, articles of this character should be set apart for the exclusive use of the patient.

Disinfection of the rooms occupied by persons sick with typhoid fever was enforced in 88 per cent of the cases, in 1912, compared with 79 per cent in former years.

While fumigation is not generally considered as necessary in typhoid fever as in scarlet fever, diphtheria, etc., still, it is a wise precaution, and this Department recommends and urges its fulfillment in every instance.

The boiling of the drinking water, in those cases where the source of contagium was traced directly, or was thought to have been due, to the water, is recommended by this Department as a precautionary measure, and was said to have been done in 86 per cent of those instances, which is a large improvement over the average for the years, 1905-1911, during which years this measure was carried out in only 65 per cent of those cases.

When the water supply is open to suspicion as the cause of an outbreak of typhoid fever, the water should always be boiled before using, either for drinking purposes or other domestic use. The water should be boiled at least five or ten minutes to insure safety. The unpalatability

of boiling water is practically removed by being aerated and stored in bottles in the ice-chest.

Screening against flies is a sanitary measure, the importance of which is being recognized more each year, although the instances in which it was thought necessary to screen against flies (during fly time) was enforced in only 69 per cent of those instances in 1912, compared with 63 per cent in former years.

While this Department has recommended only the screening of the doors and windows of houses as a precautionary measure in the spreading of the typhoid bacillus by flies, still, the time is not far distant when the Board of Health of this State will recommend that not only the houses should be screened, but that the breeding-places of these insects should also be screened. The war against flies is a reform which is sure to be taken up in earnest before many years.

TABLE 24.—*Restrictive and preventive measures in typhoid fever, in Michigan, in 1912, compared with the average for the years, 1905–1911, inclusive.*

Restrictive and preventive measures.	1912.		Average, 1905-1911.	
	Cases.	Per cent.	Cases.	Per cent.
Placarding of Premises:				
Enforced	2,034	71	1,731	63
Neglected, not stated or statements doubtful	813	29	1,021	37
Isolation of Sick Persons:				
Enforced	2,476	87	2,187	79
Neglected	38	1	208	8
Not stated or statements doubtful	333	12	356	13
Discharges from the Bowels and Bladder:				
Disinfected	2,508	88	2,311	84
Not disinfected	9	*	73	3
Not stated or statements doubtful	330	12	367	13
Clothing and Other Articles Soiled by Discharges:				
Disinfected	2,512	88	2,369	86
Not disinfected	6	*	37	1
Not stated or statements doubtful	329	12	345	13
Infected Rooms:				
Disinfected	2,503	88	2,171	79
Not disinfected	12	*	175	6
Not stated or statements doubtful	332	12	405	15
Drinking Water:				
Boiled during the period of sickness	†209	86	†149	65
Not boiled	†16	7	†74	26
Not stated or statements doubtful	†19	7	†19	9
Protection Against Flies:				
Houses screened during fly time	‡1,732	69	‡1,253	63
Not screened	‡45	2	‡217	11
Not stated or statements doubtful	‡742	29	‡515	26

*Less than one per cent.

†These figures represent the number of cases which were definitely traced, or believed to have been due, to drinking infected water.

‡During the years, 1905–1911, there were on an average 1,975 cases of typhoid fever occurring annually during those months when there was said to be no flies, therefore no necessity for screening; in 1912, there were 2,519 cases occurred during months when no files existed.

MENINGITIS, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

GENERAL PREVALENCE.

Previous to 1910, tubercular meningitis was compiled, by this department, as meningitis, but since that year has been compiled as tuberculosis, thereby conforming with the International Classification of the causes of death.

The figures contained in Table 25, although begun with the year 1898, show those deaths and death rates due to forms of meningitis other than tubercular. As will be seen by this table, the death rate from meningitis, in 1912, was the lowest of any year shown in the table.

It may also be seen by this table, that the average death rate for the five years, 1903-1907, shows a decrease of 25 per cent, compared with the previous five years, and that the average rate for the years, 1908-1912, shows a decrease of 5 per cent compared with the average rate for the five years ending with 1907.

TABLE 25.—*The prevalence of meningitis, in Michigan, in each of the fifteen years, 1898–1912.*

Years.	Deaths.	Deaths per 100,000 population.
1898	671	28.4
1899	1,051	44.0
1900	514	21.2
1901	427	17.4
1902	384	15.5
Average, 1898–1902	609	25.1
1903	382	15.3
1904	401	15.8
1905	460	18.0
1906	503	19.5
1907	569	21.8
Average, 1903–1907	463	18.1
1908	480	18.2
1909	468	17.6
1910	526	18.7
1911	487	17.0
1912	423	14.6
Average, 1908–1912	477	17.2

THE PREVALENCE OF MENINGITIS IN URBAN AND RURAL LOCALITIES.

In Table 26 is shown the death rates from this disease in the urban and rural localities. As stated previously, tubercular meningitis, prior to 1910, was compiled as meningitis instead of tuberculosis, and there being no way by which corrections could be made in this table by eliminating from the death rates the amount due to tubercular meningitis, therefore the rates of 1910, 1911 and 1912 are not comparable with those of the years preceding, but the rates for the years preceding 1910 are upon a comparable basis.

It is shown by this table that, in the urban localities, the death rate in 1912 decreased 13 per cent compared with the average rate of those localities for the two preceding years, while, by the same comparison, the figures in this table show that the rate in the urban localities decreased 27 per cent.

By comparing the death rates of the urban and rural localities in 1912, it is shown that this disease, based on the death rates, was 51 per cent less prevalent in the rural localities.

Table 26A shows the deaths and death rates of those localities comprising the first four groups of Table 26.

The localities, shown in Table 26A, having much higher death rates from this disease in 1912 than the rate for the entire State for that year (14.6), are: Adrian, Alpena, Benton Harbor, Detroit, Escanaba, Grand Haven, Hancock, Marquette, Monroe, Negaunee, Owosso, Sault Ste. Marie, Three Rivers and Traverse City.

TABLE 26.—*The prevalence of meningitis in urban and rural localities, in Michigan, as indicated by the death rates per 100,000 population in the several groups, for each of the years, 1904–1912.*

Localities—Grouped according to density of population.	Deaths per 100,000 population.								
	1904.	1905.	1906.	1907.	1908.	1909.	1910.*	1911.	1912.
Cities over 50,000	39.7	38.3	49.2	53.6	37.2	36.6	29.9	25.4	25.0
Cities from 25,000 to 50,000	27.1	22.8	16.3	26.7	23.6	25.3	22.7	13.6	10.6
Cities from 10,000 to 25,000 and Calumet township	27.0	30.3	32.1	25.9	27.9	24.7	15.6	23.3	17.7
Cities and villages from 5,000 to 10,000	27.9	28.4	25.5	31.3	39.2	21.0	22.2	16.3	13.2
Cities and villages under 5,000	16.9	27.5	20.0	19.3	20.0	13.6	12.9	13.1	13.2
Total urban	28.0	31.0	31.9	33.9	30.4	26.0	22.0	19.7	18.0
Rural localities (townships)†	17.7	18.9	15.6	16.2	14.8	16.5	12.1	12.2	8.9

*Owing to the fact that, beginning with the year 1910, tubercular meningitis was compiled as tuberculosis instead of meningitis, as in the preceding years, the number of deaths from meningitis is greatly reduced.

†Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have correspondlng populations.

TABLE 26A.—*The deaths from meningitis in 1912, and preceding years, in each of the principal localities included in the first four groups in Table 26.*

Localities.	1912.			Average, 1904–1911.		
	Population.*	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Deaths.	Deaths per 100,000 inhabitants.
Adrian	10,791	2	18.5	11,184	3	26.8
Albion	6,130	1	16.3	5,383	2	37.2
Alpena	12,808	3	23.4	12,763	3	23.5
Ann Arbor	14,890	2	13.4	14,699	5	34.0
Battle Creek	26,285	2	7.6	24,751	5	20.2
Bay City	46,674	5	10.7	41,817	8	19.1
Benton Harbor	10,013	2	20.0	7,440	1	13.4
Boyne City	6,140	0	.....	3,924	.8	20.4
Cadillac	8,869	0	.....	7,714	2	26.0
Calumet Township	21,079	3	14.2	18,548	10	53.9
Cheboygan	6,902	0	.....	6,878	3	43.6
Coldwater	5,852	0	.....	6,154	1	16.2
Detroit	515,158	153	29.7	376,881	155	41.1
Dowagiac	5,316	0	.....	4,707	1	21.2
Escanaba	13,873	4	28.8	12,392	4	32.3
Flint	46,439	3	6.5	22,129	5	22.1
Grand Haven	6,062	2	33.0	5,639	.8	14.2
Grand Rapids	118,189	11	9.3	104,104	27	25.9
Hancock	9,962	3	30.1	7,768	4	51.5
Hillsdale	5,065	0	.....	5,170	.4	7.7
Holland	10,998	1	9.1	9,930	2	20.1
Houghton	5,369	0	.....	5,016	.6	12.0
Iron Mountain	9,426	1	10.6	8,448	3	35.5
Ironwood	13,755	2	14.5	10,925	3	27.5
Ishpeming	12,723	1	7.8	11,082	6	54.1
Jackson	33,477	6	17.9	27,017	7	25.9
Kalamazoo	42,655	5	11.7	34,918	9	25.8
Lansing	34,880	2	5.7	25,020	3	12.0
Laurium	8,831	1	11.3	8,836	2	22.6
Ludington	9,756	1	10.3	7,810	3	38.4
Manistee	12,272	2	16.3	11,892	2	16.8
Marquette	11,782	3	25.5	11,177	2	17.9
Menominee	10,311	1	9.7	10,130	3	29.6
Monroe	7,148	2	28.0	6,844	2	29.2
Mt. Clemens	7,907	1	12.6	7,520	1	13.3
Muskegon	25,117	4	15.9	21,792	6	27.5
Negaunee	9,014	2	22.2	7,183	3	41.8
Niles	5,328	0	.....	4,947	1	20.2
Owosso	9,804	2	20.4	9,489	2	21.1
Pontiac	15,748	2	12.7	12,395	2	16.1
Port Huron	18,475	3	16.2	20,121	3	14.9
Saginaw	51,810	7	13.5	49,686	13	26.2
St. Joseph	6,141	0	.....	5,567	1	18.0
Sault Ste. Marie	13,006	3	23.1	12,184	4	32.8
Three Rivers	5,458	1	18.3	4,397	1	22.7
Traverse City	12,408	4	32.2	12,377	3	24.2
Wyandotte	9,241	1	10.8	6,314	3	47.5
Ypsilanti	5,778	0	.....	7,318	1	13.7

*Estimated for intercensal years.

THE SEASONAL PREVALENCE OF MENINGITIS.

It may be seen by Table 27 that, as indicated by the number of those taken sick and who died from meningitis in each month throughout the year, March, April and May are the months in which this disease is most prevalent, and during the months of October, November and December it is the least prevalent.

That this disease is most prevalent in the spring months, is, perhaps, explained by reason of the fact that influenza, pneumonia and bronchitis, which diseases are said to be predisposing causes of meningitis, are most prevalent during those months. The predisposing influences are shown in Table 28.

TABLE 27.—*The seasonal prevalence of meningitis, in Michigan, as indicated by the average number of persons taken sick and who died from this disease in each month in the fourteen years, 1899–1912.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of those taken sick	37	40	61	57	47	35	31	39	37	32	28	27
Average number of deaths.	39	47	61	65	56	44	46	46	43	38	33	33

REPORTED SOURCES OF CONTAGIUM AND PREDISPOSING INFLUENCES IN MENINGITIS.

As will be seen by the figures in Table 28, the number of instances in which cases of this disease were said to have been traced to former cases, are very few, compared to the number of cases that have occurred during the years 1899-1912, which is also true of the predisposing influences.

The natural conclusions to be drawn from the figures in this table, as far as the infectiousness of this disease is concerned, are that meningitis is not as contagious as other communicable diseases. While this may be true as regards simple meningitis, still, epidemic cerebro-spinal meningitis is considered highly contagious, although its prevalency is not as great as that of other forms. Owing to the fact that physicians, in making out the death certificates, do not always designate the kind of meningitis of which a person died, this Department, of course, can make no separate compilations of the various kinds of meningitis.

TABLE 28.—*The reported source of contagium and predisposing influences in meningitis, in Michigan, in the fourteen years, 1899–1912.*

Source and predisposing influences.	Number of instances.
Traced to a former case	85
Following an attack in the same person of:	
Influenza	170
Pneumonia	143
Bronchitis	49

INFLUENCE OF AGE AND SEX IN MENINGITIS.

This disease, as well as pneumonia, seems to have a choice in the age of its victims, pneumonia differing from meningitis, in this respect, only in the fact that it also exacts a heavy toll from those of extreme old age.

By Table 29 it may be seen that 57 per cent of the deaths from meningitis occurred among children under five years of age, and by reference to Table 5 it will be seen that 37 per cent of the deaths that occurred from pneumonia were among children under 5 years of age.

As will also be seen by the figures in Table 29, the males seem to suffer more from this disease than do the females, which is also true of pneumonia, 55 per cent of the total deaths from meningitis occurring among the males, which per cent is identically the same as the deaths among males from pneumonia.

That an association or relationship seems to exist between meningitis and pneumonia, is also borne out by the table showing the seasonal prevalence, in which it is shown that the months of their greatest prevalence are identical; by the table showing predisposing influences, in which it shows that pneumonia was followed by meningitis; by the similarity of the ages of those contributing the greatest per cent of deaths to the total deaths from these diseases, and by the fact that both diseases exact their greater toll from the males.

TABLE 29.—*The influence of age and sex in meningitis, in Michigan, as indicated by the number of those of known ages who died from this disease in the fourteen years, 1899–1912. Arranged by sex, in age periods of five years each.*

Age periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 5 years	2,746	2,154	4,900	31.86	25.00	56.86	196	154	350
5 to 9 years	454	476	930	5.27	5.52	10.79	32	34	66
10 to 14 years	268	274	542	3.11	3.18	6.29	19	20	39
15 to 19 years	266	215	481	3.09	2.49	5.58	19	17	36
20 to 24 years	183	145	328	2.12	1.68	3.80	13	10	23
25 to 29 years	131	118	249	1.52	1.37	2.89	10	8	18
30 to 34 years	114	90	204	1.32	1.05	2.37	8	7	15
35 to 39 years	116	86	202	1.34	1.00	2.34	8	6	14
40 to 44 years	96	71	167	1.12	.82	1.94	7	5	12
45 to 49 years	95	61	156	1.10	.71	1.81	7	4	11
50 years and over	291	168	459	3.38	1.95	5.33	21	12	33
Total	4,760	3,858	8,618	55.23	44.77	100.00	340	277	617

THE DURATION OF SICKNESS IN MENINGITIS.

Table 30 shows that, of 5,141 fatal cases of meningitis, in which the duration of sickness was reported, during the twelve years, 1901-1912, practically 40 per cent of those who died were sick from one to five days; 64 per cent from one to ten days, and 79 per cent from one to fifteen days.

TABLE 30.—*The duration of sickness in fatal cases of meningitis, of known duration, in Michigan, in the twelve years, 1901–1912. Arranged by sex in five-day periods.*

Duration periods.	Number of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males	Females.	Both sexes.	Males	Females.	Both sexes.
1 to 5 days	1,175	878	2,053	22.85	17.08	39.93	98	73	171
6 to 10 days	667	599	1,266	12.98	11.65	24.63	56	50	106
11 to 15 days	384	359	743	7.47	6.98	14.45	32	30	62
16 to 20 days	153	172	325	2.98	3.34	6.32	13	14	27
21 to 25 days	139	123	262	2.70	2.40	5.10	12	10	22
26 to 30 days	64	67	131	1.25	1.30	2.55	5	6	11
31 to 35 days	34	32	66	.66	.62	1.28	3	3	6
36 to 40 days	22	26	48	.43	.50	.93	2	2	4
41 to 45 days	21	19	40	.41	.37	.78	2	1	3
46 to 50 days	11	16	27	.22	.31	.53	1	1	2
51 days and over	95	85	180	1.85	1.65	3.50	8	7	15
Total	2,765	2,376	5,141	53.80	46.20	100.00	232	197	429

RESTRICTIVE AND PREVENTIVE MEASURES IN MENINGITIS.

By the figures contained in Table 31, it will be noted that the restrictive and preventive measures were carried out in a much larger per cent of the cases, in 1912, as compared with the average for the years, 1904-1911.

If, as stated previously, pneumonia is one of the predisposing influences in meningitis, and it undoubtedly is, and to a much greater extent than our records show, then it would seem that the most important restrictive measure in the prevention of meningitis is the prevention, at least, of that one primary cause—pneumonia. The reduction of the prevalence of pneumonia means the proportionate reduction of the prevalence of meningitis to the degree in which pneumonia is the predisposing cause of meningitis.

TABLE 31.—*Restrictive and preventive measures in meningitis, in Michigan, in 1912, compared with the average for the years, 1904–1911, inclusive.*

Restrictive and preventive measures	1912.		Average, 1904-1911.	
	Cases.	Per cent.	Cases.	Per cent.
Isolation of Sick Persons:				
Enforced	291	68	183	30
Neglected	43	10	124	21
Not stated or statements doubtful	100	22	293	49
Disinfection of Sputa:				
Enforced	290	*68	195	*34
Neglected	27	* 6	69	*12
Not stated or statements doubtful	108	*26	304	*54
Disinfection of Bedding, Clothing, etc., Spoiled by Sputa:				
Enforced	310	*73	287	*50
Neglected	19	* 4	54	*10
Not stated or statements doubtful	96	*23	227	*40
Disinfection of Room Occupied by Patient:				
Enforced	325	75	347	58
Neglected	12	3	67	11
Not stated or statements doubtful	97	22	186	31

*In 1912, there were 9 instances in which there was said to be no sputa; for the years 1904–1911, there were on the average 33 instances annually in which there was said to be no sputa, therefore these figures have been excluded in making the per cents.

DIPHTHERIA AND CROUP, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

GENERAL PREVALENCE.

That diphtheria as a disease, in Michigan, is becoming less and less fatal each year is shown by Table 32.

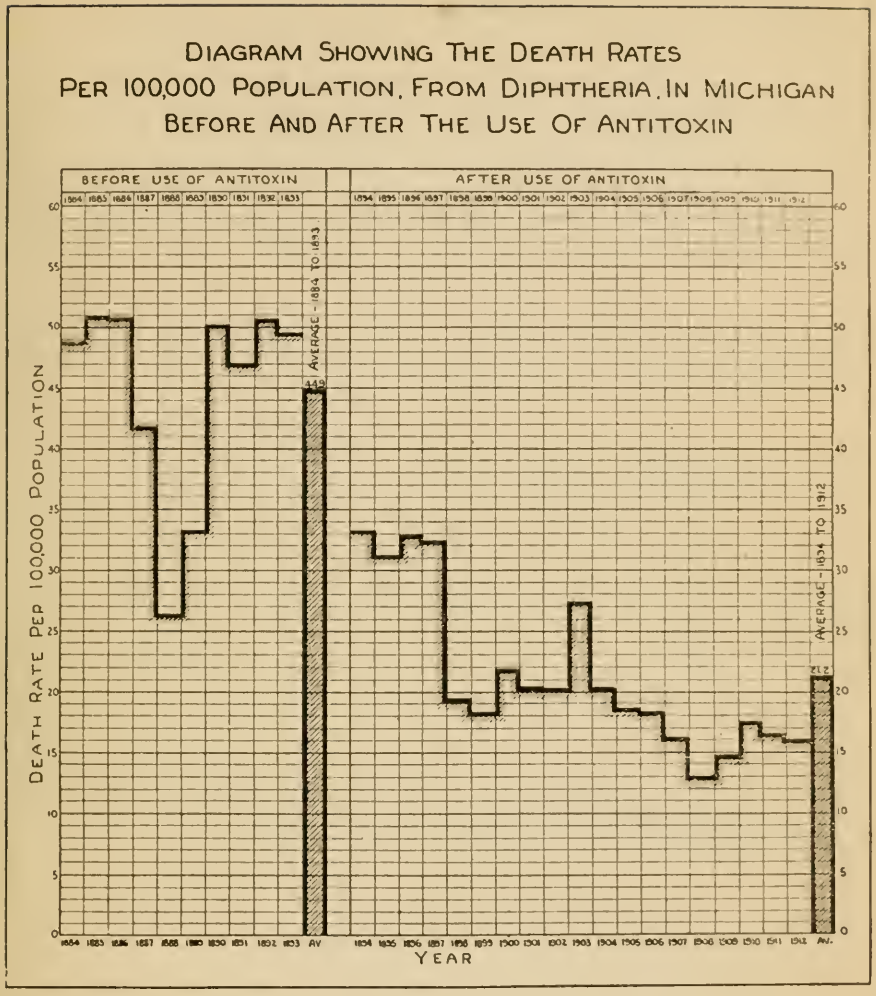
This Table has been divided into two periods—the years previous to the use of antitoxin, 1884-1893, and the years since antitoxin has been generally used in the treatment of this disease, 1894-1912, the latter period being again sub-divided into five-year periods and averaged. It will be seen by this table that the average death rate decreased 53 per cent during the years since antitoxin was introduced, compared with the average rate during the years prior to its introduction, and, during same period, the fatality rate (death per 100 cases) shows a decrease of 27 per cent.

That the reduction in the death and fatality rates in this disease is due, practically alone, to the antitoxin treatment, there is no doubt. Still, there are two other factors that must be considered as agents in this reduction: (a). By the establishment, in 1907, of the Michigan State Board of Health Laboratory, making it possible for the physicians of the State to obtain an early and accurate diagnosis in doubtful cases of this disease, for, if the diagnosis is not made early enough, the value of the antitoxin treatment may be entirely lost. (b). By the enforcement of the restrictive and preventive measures, as recommended by this Department, the most important of which is the isolation of the persons exposed to or sick with diphtheria, thereby limiting the number of cases compared with the number that would be in existence if this restrictive measure was not enforced. Disinfection is the next restrictive measure in degree of importance in limiting the number of cases, for it is a well known fact that the origin of many cases of this disease has been directly traced to the handling of clothing, etc., of persons sick or who had been sick with diphtheria, and which were not disinfected, and to undisinfected houses in which diphtheria had previously existed.

TABLE 32.—*The prevalence of diphtheria, in Michigan, during the ten years, 1884–1893, and before the use of antitoxin; also a similar statement for the nineteen years, 1894–1912, since the beginning of the general use of antitoxin.*

Years.	Cases.*	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population
1884	3,915	905	23.1	48.8
1885	4,018	964	24.0	50.9
1886	4,244	982	23.1	50.8
1887	3,382	825	24.4	41.8
1888	2,228	532	23.9	26.4
1889	3,157	683	21.6	33.3
1890	4,206	1,050	25.0	50.1
1891	4,385	1,002	22.9	47.0
1892	4,818	1,099	22.8	50.7
1893	4,736	1,092	23.1	49.5
Average, 1884–1893	3,909	913	23.4	44.9
1894	3,852	744	19.3	33.2
1895	3,433	708	20.6	31.2
1896	4,013	757	18.9	32.9
1897	4,132	756	18.3	32.4
Average, 1894–1897	3,858	741	19.2	32.4
1898	2,357	456	19.3	19.4
1899	2,154	435	20.2	18.2
1900	2,706	529	19.5	21.9
1901	2,498	502	20.1	20.5
1902	2,993	504	16.8	20.4
Average, 1898–1902	2,542	485	19.1	20.1
1903	3,670	686	18.7	27.4
1904	3,510	515	14.7	20.4
1905	2,159	478	22.1	18.7
1906	3,648	472	12.9	18.3
1907	2,935	421	14.3	16.1
Average, 1903–1907	3,184	514	16.2	20.1
1908	2,658	343	12.9	13.0
1909	3,109	395	12.7	14.9
1910	3,433	495	14.4	17.6
1911	3,762	473	12.6	16.6
1912	3,294	465	14.1	16.0
Average, 1908–1912	3,251	434	13.4	15.6

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.



THE PREVALENCE OF DIPHTHERIA IN URBAN AND RURAL LOCALITIES.

By the figures contained in Table 33 it will be seen that diphtheria is more prevalent, (as indicated by the death rates), in the urban localities than in the rural, the average rate in the rural being 41 per cent less than the urban. It will also be seen by this table that the disease, in the rural localities in 1912, decreased 31 per cent as compared with their average rate, while, by the same comparison, the death rate decreased only one per cent in the urban localities.

The cities of the urban localities, showing the highest average rate, were those of 50,000 inhabitants and over, and, while there is a downward tendency in the prevalence of diphtheria with the decrease in the density of population, still that decrease is not gradual. This fact might be due to several reasons. A difference in the age distribution of

their populations, and the sanitary conditions that might influence the prevalence of this disease, being two of the foremost reasons.

Table 33A contains the deaths and death rates from diphtheria of those cities comprising the first four groups of Table 33, and by which may be determined the prevalence of this disease in any of these localities in 1912, compared with the average of such localities, also to determine the prevalency in one locality compared with that of another.

The cities, shown in this Table, having a much higher death rate from this disease, in 1912, than the rate for the State as a whole (16.0) were: Battle Creek, Cheboygan, Detroit, Iron Mountain, Jackson, Negaunee, Saginaw, Sault Ste. Marie and Wyandotte.

TABLE 33.—*The prevalence of diphtheria in urban and rural localities, in Michigan, as indicated by the death rates per 100,000 population in the several groups, for each of the years, 1904–1912.*

Localities—Grouped according to density of population.	Deaths per 100,000 population.									
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Average 1904–1911.	1912.
Cities over 50,000	37.5	35.7	33.6	22.1	15.8	23.8	25.8	29.1	27.5	31.5
Cities from 25,000 to 50,000	21.6	28.3	27.2	15.4	6.3	11.7	7.1	10.4	15.3	15.3
Cities from 10,000 to 25,000 and Calumet township	24.4	19.0	16.1	19.2	21.9	20.2	29.5	16.3	20.7	10.7
Cities and villages from 5,000 to 10,000	17.2	20.3	18.3	9.7	24.4	24.7	18.6	16.3	18.8	18.3
Cities and villages under 5,000	19.4	10.7	9.7	10.5	7.9	10.2	16.6	11.7	12.2	7.9
Total urban	25.9	23.1	21.4	16.3	15.1	18.8	20.9	19.4	20.0	19.8
Rural localities (townships)*	16.0	12.7	13.1	13.2	9.2	10.4	9.6	10.0	11.8	8.1

*Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 33A.—*The prevalence of diphtheria in 1912, and preceding years, in each of the principal localities included in the first four groups in Table 33.*

Localities.	1912.				Average, 1904–1911.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	10,791	†	1	9.3	11,184	12	2	17.9
Albion	6,130	19	1	16.3	5,383	2	0	.....
Alpena	12,808	†	1	7.8	12,763	‡6	3	23.5
Ann Arbor	14,890	10	2	13.4	14,699	12	.8	5.4
Battle Creek	26,285	97	8	30.4	24,751	57	3	12.1
Bay City	46,674	8	3	6.4	41,817	51	6	14.3
Benton Harbor	10,013	0	0	.....	7,440	7	.6	8.1
Boyne City	6,140	0	0	.....	3,924	‡	.4	10.2
Cadillac	8,869	4	1	11.3	7,714	8	1	13.0
Calumet Township	21,079	†	5	23.7	18,548	25	6	32.3
Cheboygan	6,902	43	9	130.4	6,878	3	.8	11.6
Coldwater	5,852	8	1	17.1	6,154	2	.1	1.6
Detroit	515,158	1,438	190	36.9	376,881	857	113	30.0
Dowagiac	5,316	8	1	18.8	4,707	3	.6	12.7
Escanaba	13,893	9	1	7.2	12,392	33	4	32.3
Flint	46,439	38	3	6.5	22,129	22	4	18.1
Grand Haven	6,062	7	1	16.5	5,639	2	1	1.8
Grand Rapids	118,189	117	14	11.8	104,104	213	22	21.1
Hancock	9,962	†	1	10.0	7,768	‡	2	25.7
Hillsdale	5,065	0	0	.....	5,170	9	.1	1.9
Holland	10,998	†	2	18.2	9,930	9	1	10.1
Houghton	5,369	2	1	18.6	5,016	‡	.9	17.9
Iron Mountain	9,426	50	8	84.9	8,448	13	4	47.3
Ironwood	13,755	3	0	.....	10,925	‡	7	64.1
Ishpeming	12,723	9	1	7.9	11,082	66	6	54.1
Jackson	33,477	45	17	50.8	27,017	43	5	18.5
Kalamazoo	42,655	36	6	14.1	34,918	46	3	8.6
Lansing	34,880	38	2	5.7	25,020	25	3	12.0
Laurium	8,831	0	0	.....	8,836	‡	2	22.6
Ludington	9,756	3	0	.....	7,810	17	3	38.4

TABLE 33A.—*Concluded.*

Manistee	12,272	9	0	.....	11,892	18	2	16.8
Marquette	11,782	26	1	8.5	11,177	14	2	17.9
Menominee	10,311	0	0	.....	10,130	5	1	9.9
Monroe	7,148	3	1	14.0	6,844	15	1	14.6
Mt. Clemens	7,907	14	1	12.6	7,520	§20	4	53.2
Muskegon	25,117	3	0	.....	21,792	23	3	13.8
Negaunee	9,014	11	2	22.2	7,183	25	2	27.8
Niles	5,328	5	0	.....	4,947	1	.3	6.1
Owosso	9,804	2	0	.....	9,489	5	.9	9.5
Pontiac	15,748	41	2	12.7	12,395	¶66	5	40.3
Port Huron	18,475	9	2	10.8	20,121	42	5	24.8
Saginaw	51,810	206	12	23.2	49,686	115	10	20.1
St. Joseph	6,141	0	0	.....	5,567	2	.4	7.2
Sault Ste. Marie	13,006	28	3	23.1	12,184	10	2	16.4
Three Rivers	5,458	†	1	18.3	4,397	‡	.4	9.1
Traverse City	12,408	8	2	16.1	12,377	11	.5	4.0
Wyandotte	9,241	16	3	32.5	6,314	¶16	3	47.5
Ypsilanti	5,778	2	0	.....	7,318	¶11	2	27.3

*Estimated for intercensal years.
†Fatal cases only.
‡6 year average.
§7 year average.
¶4 year average.

THE SEASONAL PREVALENCE OF DIPHTHERIA.

As may be seen by Table 34, as indicated by the average number of deaths occurring in each month throughout the year, diphtheria is least prevalent during the months of June, July and August, and most prevalent during the months of November, December and January; in other words, diphtheria is a cold weather disease.

The following diagram, comparing the average monthly temperature and the average number of monthly deaths, in Michigan, is designed to illustrate Table 34.

A diagram showing the similarity of the curves between relative humidity, velocity of wind, and the prevalence of diphtheria is herewith reproduced, and by which it will also be seen that the prevalence of diphtheria is somewhat more frequent in damp weather, and that in those months when the wind velocity is higher, the prevalence of the disease also increases.

TABLE 34.—*Showing the seasonal prevalence of diphtheria, as indicated by the average number of deaths occurring in each month, in Michigan, during the years, 1898–1912, inclusive.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of deaths.	56	41	33	33	31	29	24	26	36	54	59	56

DIAGRAM SHOWING THE AVERAGE NUMBER OF MONTHLY DEATHS FROM DIPHTHERIA AND THE AVERAGE MONTHLY TEMPERATURE, FOR THE YEARS, 1898-1912, INCLUSIVE.

DIPHTHERIA ————
TEMPERATURE — — — —

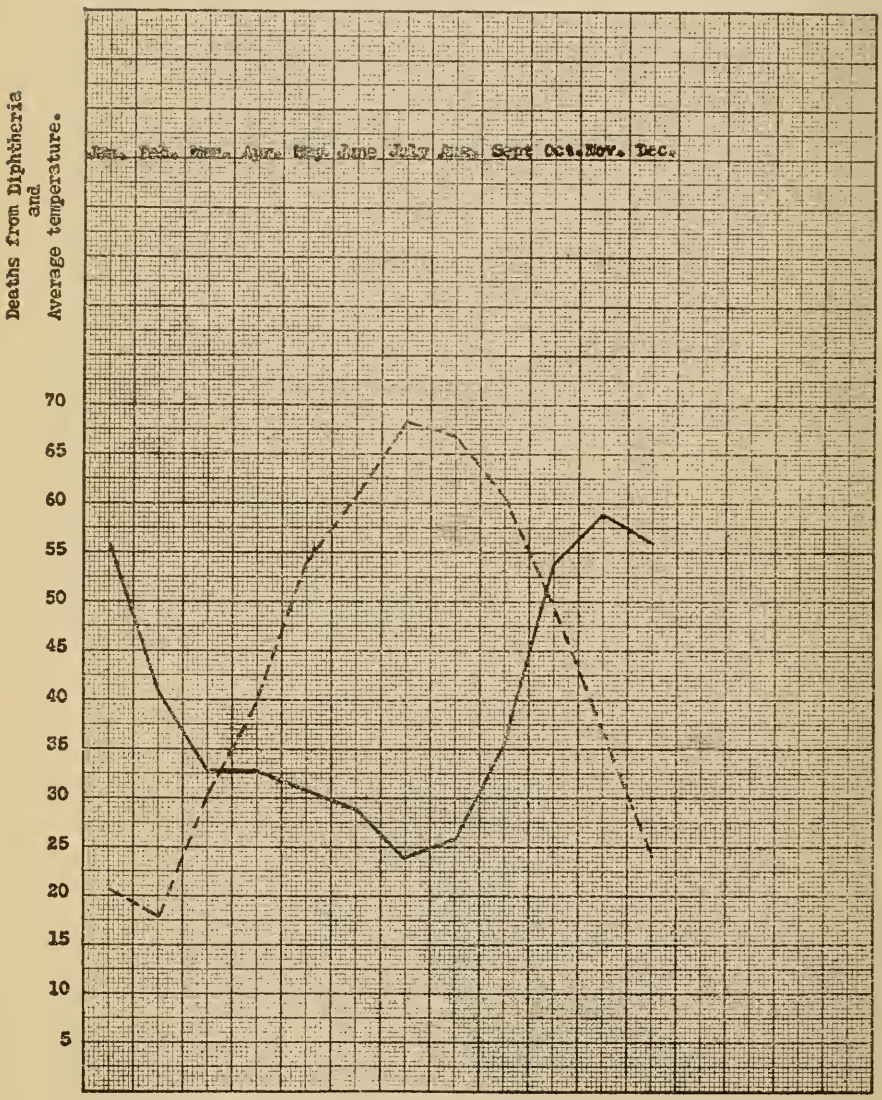
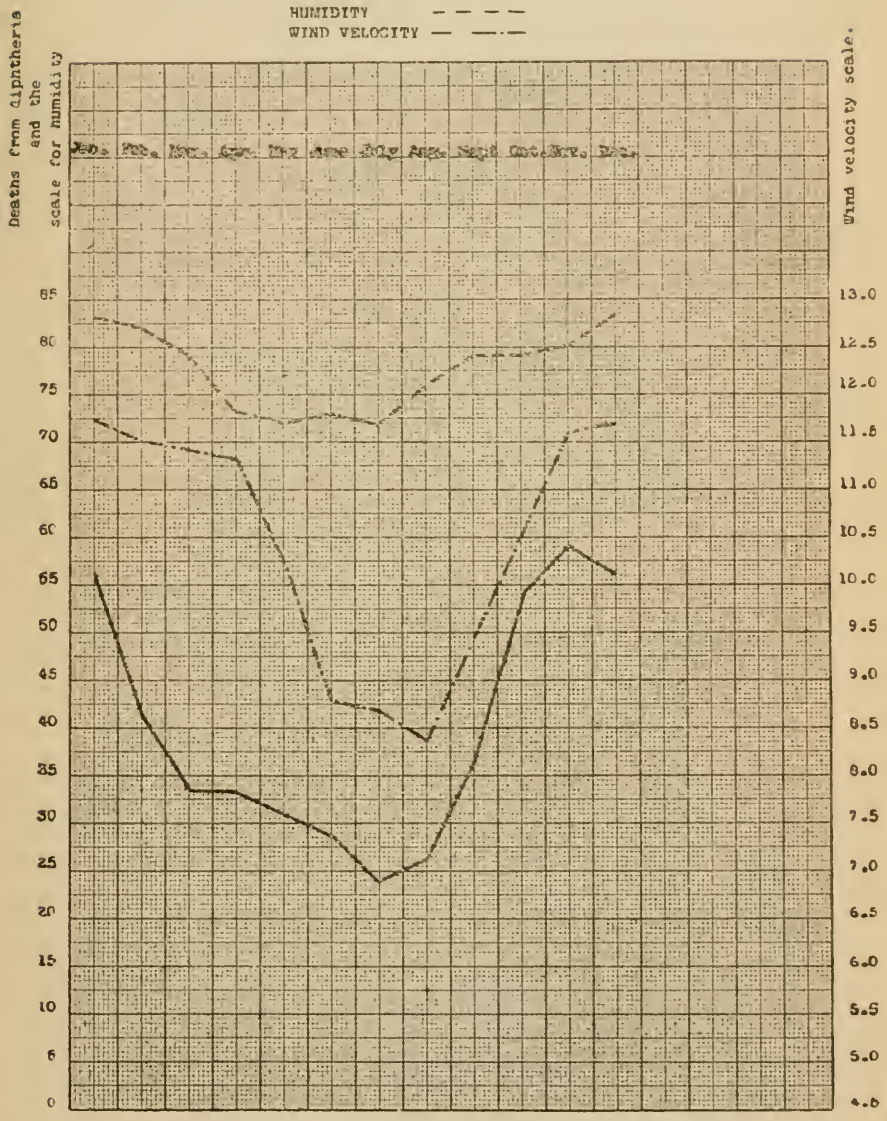


DIAGRAM SHOWING THE AVERAGE NUMBER OF MONTHLY DEATHS FROM DIPHTHERIA AND THE AVERAGE MONTHLY WIND VELOCITY AND RELATIVE HUMIDITY, FOR THE YEARS, 1898-1912, INCLUSIVE.

DIPHTHERIA ————————

HUMIDITY — — — —

WIND VELOCITY — —·—



INFLUENCE OF AGE IN FATAL CASES OF DIPHTHERIA.

By the following table, the figures in which were taken from the U. S. Mortality Statistics for 1912, it may be seen that the persons living at ages of from 0-10 years seem to be the most susceptible to this disease, as 48 per cent of the total deaths from diphtheria occurred among children under five years of age; 32 per cent between the ages of from 5-9 years; 15 per cent between the ages of from 10-19 years, and only 4.9 per cent at 20 years of age and over.

Age groups.	Deaths from diphtheria.	Per cent of total.
Under 1 year	15	3.2
1 year	47	10.3
2 years	50	10.7
3 years	68	14.6
4 years	44	9.8
Under 5 years	224	48.0
5–9 years	150	32.1
10–19 years	70	15.0
20–29 years	9	1.9
30 years and over	14	3.0
Total	467	100.0

WHOOPING-COUGH, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

GENERAL PREVALENCE.

Whooping-cough is a very prevalent contagious disease of children; oftenest seen under the age of five years, but most common among children under two years, those of that age contributing 81.7 per cent of the deaths from this disease in 1912, and the deaths under five years constituted 95.1 per cent of the total deaths in that year.

Whooping-cough is a more serious disease than is ordinarily supposed, and the younger the patient the more dangerous is the disease. An appalling number of children die from its effects, usually as the result of some complication, especially pneumonia, tuberculosis, convulsions, or affections of the bowels. The contagious principle seems to reside in the expectoration and the breath, and probably is active during the whole attack. It usually requires close proximity to communicate it, and just how long the disease is contagious is uncertain, although it is safe in saying that it averages six or eight weeks from the beginning of the attack.

As stated in the preceding paragraph, whooping-cough is communicated by the breath and expectoration, therefore great care should be

exercised in the isolation of the patient and the disinfection of the sputa and the articles soiled by sputa, such as the bedding, clothing, etc. The disinfection of the house is also a necessary precautionary measure.

In studying Table 35, it would seem that whooping-cough, since 1897, is on the increase in prevalency, but, as previously mentioned, the law providing for the compulsory reporting of all deaths did not take effect until the year 1898, therefore the deaths and death rates previous to 1898 are not comparable with those following that year. By comparing the average rates of each of the five years following 1897 it will be seen that the prevalence of this disease remains practically stationary, although the death rates for single years show considerable fluctuations.

TABLE 35.—*The prevalence of whooping-cough, in Michigan, during the twenty-seven years, 1886–1912.*

Years.	Cases.*	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1886	2,642	62	2.3	3.2
1887	2,267	59	2.6	2.0
1888	2,502	49	2.0	2.4
1889	2,694	41	1.5	2.0
1890	983	20	2.0	1.0
1891	2,360	101	4.3	4.7
1892	3,188	77	2.4	3.6
1893	4,047	134	3.3	6.1
1894	4,555	123	2.7	5.5
1895	4,284	109	2.5	4.8
1896	5,466	91	1.7	4.0
1897	3,978	72	1.8	3.1
Average, 1886–1897	3,247	78	2.4	3.6
1898	5,300	282	5.3	12.0
1899	6,509	238	3.7	10.0
1900	3,397	208	6.1	8.6
1901	2,955	163	5.5	6.7
1902	3,534	289	8.2	11.7
Average, 1898–1902	4,339	236	5.4	9.8
1903	4,172	383	9.2	15.3
1904	1,779	148	8.3	5.8
1905	1,196	131	11.0	5.1
1906	1,364	469	34.4	18.1
1907	872	223	25.6	8.5
Average, 1903–1907	1,877	271	14.4	10.6
1908	1,248	305	24.4	11.6
1909	1,054	217	20.6	8.1
1910	1,136	318	28.0	11.3
1911	1,897	254	13.4	8.9
1912	1,255	252	20.0	8.7
Average, 1908–1912	1,318	269	20.4	9.7

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

SEASONAL PREVALENCE OF WHOOPING-COUGH.

Whooping-cough seems to be most prevalent during the early spring and summer months, or during the months of from February to September, inclusive, the number of deaths showing a decided decrease in October and continue practically the same during the winter months. These figures are shown in Table 36.

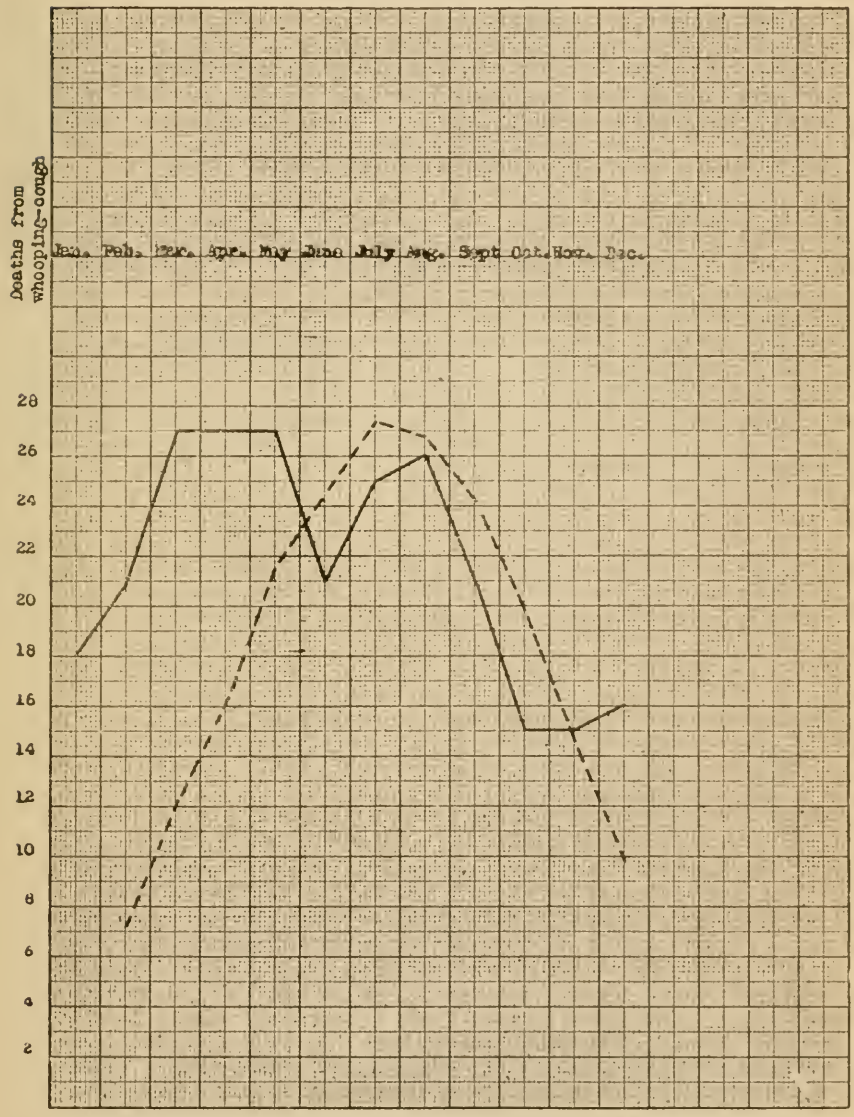
The diagram on the following page was prepared for the purpose of studying the influence of temperature on the prevalence of whooping-cough, and by which it may be seen that the prevalence of whooping-cough is governed somewhat by the temperature.

TABLE 36.—*Showing the seasonal prevalence of whooping-cough, as indicated by the average number of deaths occurring in each month, in Michigan, during the years, 1898–1912, inclusive.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of deaths per month.....	18	21	27	27	27	21	25	26	21	15	15	16

DIAGRAM SHOWING THE AVERAGE NUMBER OF MONTHLY DEATHS FROM WHOOPING-COUGH AND THE AVERAGE MONTHLY TEMPERATURE. FOR THE YEARS. 1898-1912. INCLUSIVE.

WHOOPING-COUGH ———
TEMPERATURE. — — —



SCARLET FEVER, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

GENERAL PREVALENCE.

By Table 37 may be seen the general prevalence of scarlet fever for each of the years, 1884-1912. The prevalence of this disease, as was the case with whooping-cough, does not vary a great deal, as indicated by the average death rate for each of the five-year periods following 1897, but the rate for single years show considerable fluctuations.

Scarlet fever is a disease confined mostly to children under five years of age. In 1912, 51 per cent of the total deaths from this disease occurred among children of the above age. Of the children under five years of age, those whose ages range from one to three years, inclusive, seem to be the most susceptible to this disease.

The danger of this disease does not lie solely in the probability of dying from it, but in the complication and sequela. Owing to the fact that this disease is transmitted by the mucous discharges from nose and mouth and throat during desquamative period, and owing to the longevity of those germs in garments, etc., the restrictive and preventive measures recommended by this Department should be very thoroughly enforced by the local health authorities.

TABLE 37.—*The prevalence of scarlet fever, in Michigan, during the twenty-nine years, 1884–1912.*

Years.	Cases.*	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1884	2,476	230	9.3	12.4
1885	2,750	187	6.8	9.9
1886	3,046	275	9.0	14.2
1887	3,400	314	9.2	15.9
1888	2,989	200	6.7	9.9
1889	3,535	166	4.7	8.1
1890	3,835	162	4.2	7.7
1891	6,212	286	4.6	13.4
1892	7,075	487	6.9	22.5
1893	6,065	415	6.8	18.8
1894	5,500	203	3.7	9.1
1895	3,908	125	3.2	5.5
1896	2,646	81	3.1	3.9
1897	2,482	115	4.6	4.9
Average, 1884–1897	3,994	232	5.8	11.0
1898	2,409	91	3.8	3.9
1899	4,345	144	3.3	6.0
1900	6,734	272	4.0	11.2
1901	7,726	312	4.0	12.7
1902	6,582	277	4.2	11.2
Average, 1898–1902	5,559	219	3.9	9.1
1903	5,353	200	3.7	8.0
1904	4,088	210	5.1	8.3
1905	2,286	123	5.4	4.8
1906	3,066	227	7.4	8.8
1907	2,514	159	6.3	6.1
Average, 1903–1907	3,461	184	5.3	7.2
1908	3,087	194	6.3	7.4
1909	5,153	275	5.3	10.3
1910	6,501	297	4.6	10.6
1911	5,177	208	4.0	7.3
1912	4,533	186	4.1	6.4
Average, 1908–1912	4,890	232	5.8	8.4

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

THE PREVALENCE OF SCARLET FEVER IN URBAN AND RURAL LOCALITIES.

In the column under the caption, "average, 1904-1911," in Table 38, it may be seen that, as indicated by the death rates, scarlet fever was more prevalent in the urban than in the rural localities, the prevalence in the rural localities being 44 per cent less.

While, as above stated, this disease was more prevalent on the average in the urban localities as compared with the rural, still, the death rate in 1912, compared with the average rate, shows that the prevalence of

this disease decreased 37 per cent in the urban, and, by the same comparison, increased 10.7 per cent in the rural localities.

The localities, comprising the first four groups of Table 38, that showed much higher death rates from scarlet fever in 1912, than the rate for the State as a whole for that year, (6.4), are: Adrian, Albion, Alpena, Ann Arbor, Bay City, Benton Harbor, Calumet township, Detroit, Escanaba, Grand Haven, Hancock, Holland, Iron Mountain, Ironwood, Jackson, Kalamazoo, Laurium, Ludington, Manistee, Marquette, Menominee, Monroe, Mt. Clemens, Muskegon, Negaunee, Owosso, Pontiac, Port Huron, Saginaw, Sault Ste. Marie, Three Rivers, Traverse City and Wyandotte.

TABLE 38.—*The prevalence of scarlet fever in urban and rural localities, in Michigan, as indicated by the death rates per 100,000 population in the several groups, for each of the years, 1904–1912.*

Localities—Grouped according to density of population.	Deaths per 100,000 population.									
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Average 1904–1911.	1912.
Cities over 50,000	10.6	7.8	26.3	17.7	16.2	20.6	17.2	11.3	15.9	9.8
Cities from 25,000 to 50,000	5.4	2.8	4.1	3.3	14.2	13.0	12.8	4.1	7.5	5.5
Cities from 10,000 to 25,000 and Calumet township	13.1	2.3	4.6	5.5	6.0	10.8	8.9	7.5	7.3	3.3
Cities and villages from 5,000 to 10,000	6.4	12.9	4.6	9.1	4.2	17.2	18.0	9.1	10.3	2.9
Cities and villages under 5,000	6.0	4.5	4.6	1.7	4.5	5.7	6.7	4.4	4.8	3.8
Total urban	8.8	5.9	11.5	8.7	9.8	14.2	13.0	7.9	10.0	6.3
Rural localities (townships)*	9.2	3.8	5.5	3.8	4.3	5.2	7.6	5.4	5.6	6.0

*Exclusive of Calumet township, which, for the purpose of this study, is included in the third group of urban localities which have corresponding populations.

TABLE 38A.—*The prevalence of scarlet fever in 1912, and preceding years, in each of the principal localities included in the first four groups in Table 38.*

Localities.	1912.				Average, 1904-1911.			
	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.*	Cases.	Deaths.	Deaths per 100,000 inhabitants.
Adrian	10,791	2	2	18.5	11,184	3	.5	4.5
Albion	6,130	1	1	16.3	5,383	4	.1	1.9
Alpena	12,808	3	3	23.4	12,763	1	.3	2.4
Ann Arbor	14,890	2	2	13.4	14,699	18	0	.....
Battle Creek	26,285	2	2	7.6	24,751	46	.4	1.6
Bay City	46,674	5	5	10.7	41,817	146	7	16.7
Benton Harbor	10,013	2	2	20.0	7,440	17	.9	12.1
Boyne City	6,140	0	0	.....	3,924	7	.5	12.7
Cadillac	8,869	0	0	.....	7,714	11	2	25.9
Calumet Township	21,079	3	3	14.2	18,548	45	4	21.6
Cheboygan	6,902	0	0	.....	6,878	6	.3	4.4
Coldwater	5,852	0	0	.....	6,154	11	.1	1.6
Detroit	515,158	164	153	29.7	376,881	807	159	42.2
Dowagiac	5,316	0	0	.....	4,707	1	0	.....
Escanaba	13,893	5	4	28.8	12,392	15	.8	6.5
Flint	46,439	3	3	6.5	22,129	27	.9	4.1
Grand Haven	6,062	2	2	33.0	5,639	26	.3	5.3
Grand Rapids	118,189	11	11	9.3	104,104	382	11	10.6
Hancock	9,962	3	3	30.1	7,768	†	.4	5.1
Hillsdale	5,065	0	0	.....	5,170	7	.3	5.8
Holland	10,998	1	1	9.1	9,930	24	.8	8.1
Houghton	5,369	0	0	.....	5,016	.1	0	.....
Iron Mountain	9,426	1	1	10.6	8,448	16	2	23.7
Ironwood	13,755	2	2	14.5	10,925	†	3	27.5
Ishpeming	12,723	2	1	7.8	11,082	38	2	18.0
Jackson	33,477	6	6	17.9	27,017	37	1	3.7
Kalamazoo	42,655	5	5	11.7	34,918	75	2	5.7
Lansing	34,880	2	2	5.7	25,020	18	.5	2.0
Laurium	8,831	1	1	11.3	8,836	†	.3	34.0
Ludington	9,765	1	1	10.3	7,810	6	.6	7.7

TABLE 38A.—*Concluded.*

Manistee	12,272	2	2	16.3	11,892	24	1	8.4
Marquette	11,782	2	3	25.5	11,177	17	1	8.9
Menominee	10,311	1	1	9.7	10,130	13	.6	5.9
Monroe	7,148	2	2	28.0	6,844	8	.1	1.5
Mt. Clemens	7,907	1	1	12.6	7,520	3	.4	5.3
Muskegon	25,117	4	4	15.9	21,792	76	1	4.6
Negaunee	9,014	2	2	22.2	7,183	11	.6	8.4
Niles	5,328	0	0	.....	4,947	16	.1	2.0
Owosso	9,804	2	2	20.4	9,489	6	.3	3.2
Pontiac	15,748	2	2	12.7	12,395	15	.8	6.5
Port Huron	18,475	3	3	16.2	20,121	34	.8	4.0
Saginaw	51,810	7	7	13.5	49,686	56	1	2.0
St. Joseph	6,141	0	0	.....	5,567	†	2	34.1
Sault Ste. Marie	13,006	3	3	23.1	12,184	10	.4	3.3
Three Rivers	5,458	1	1	18.3	4,397	3	.3	6.8
Traverse City	12,408	4	4	32.2	12,377	19	.4	3.2
Wyandotte	9,241	1	1	10.8	6,314	15	1	15.8
Ypsilanti	5,778	0	0	.....	7,318	6	.5	6.8

*Estimated for intercensal years.
†Fatal cases only reported.

SEASONAL PREVALENCE OF SCARLET FEVER.

By Table 39, as indicated by the average number of deaths occurring in each month, scarlet fever was most prevalent in the months of from December to May and least prevalent during the months of July, August and September.

The following plates illustrate the relation between temperature, wind velocity and the prevalence of scarlet fever.

TABLE 39.—*Showing the seasonal prevalence of scarlet fever, as indicated by the average number of deaths occurring in each month, in Michigan, during the years, 1898–1912, inclusive.*

Month.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of deaths per month.....	26	21	25	20	20	13	10	10	9	14	19	22

DIAGRAM SHOWING THE AVERAGE NUMBER OF MONTHLY DEATHS FROM SCARLET FEVER AND THE AVERAGE MONTHLY TEMPERATURE, FOR THE YEARS, 1898-1912, INCLUSIVE.

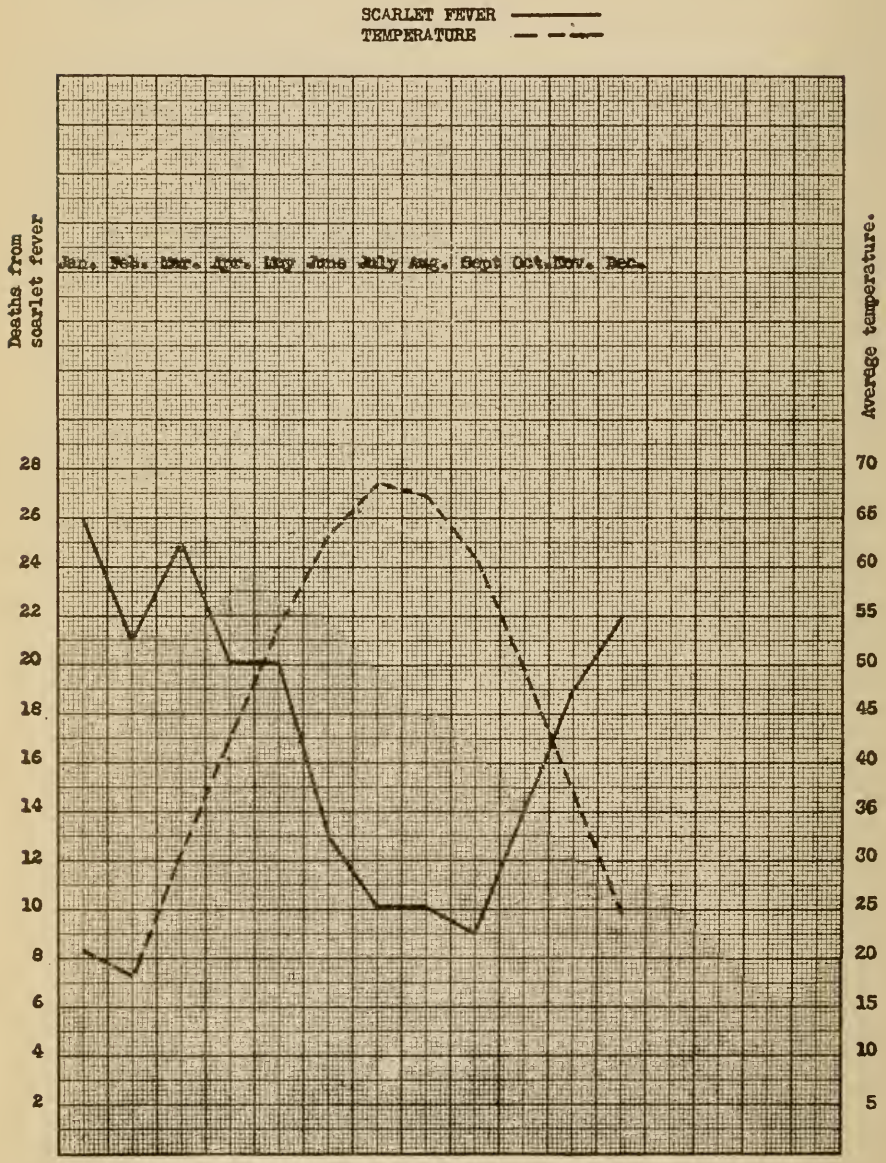
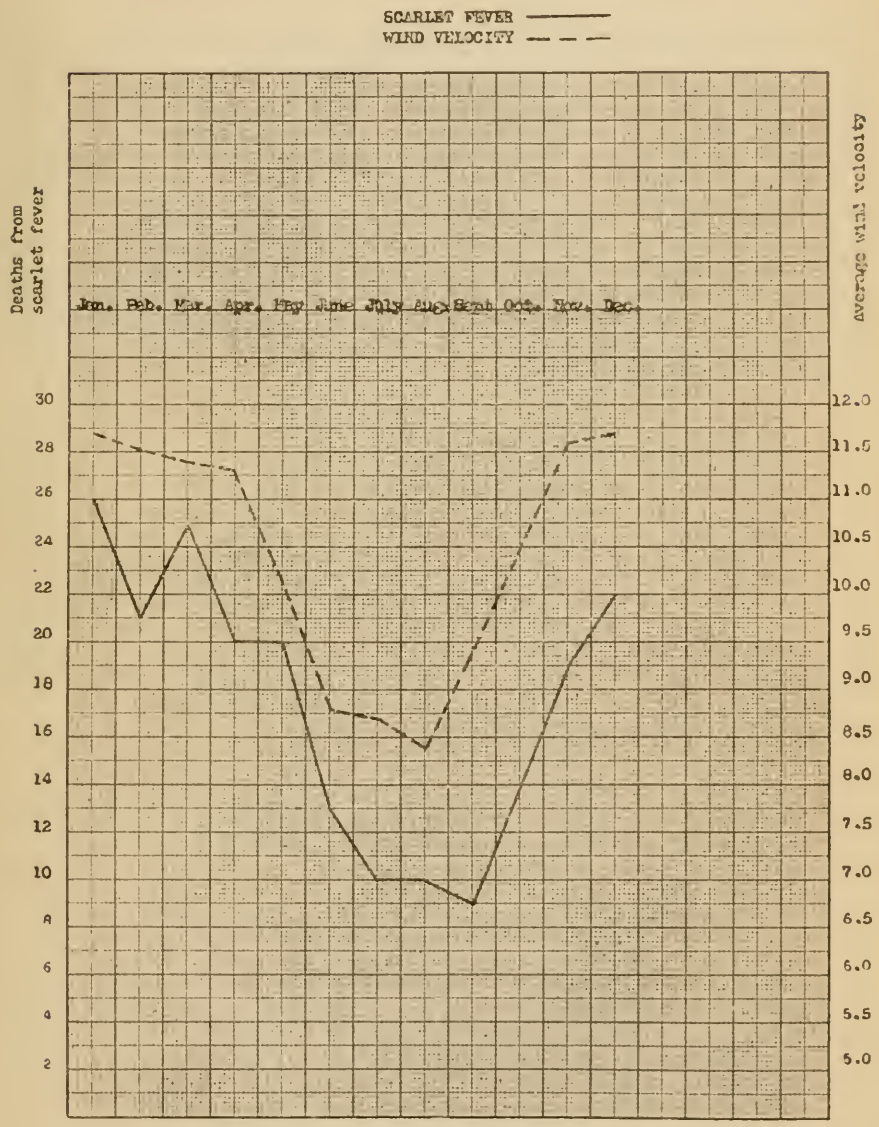


DIAGRAM SHOWING THE AVERAGE NUMBER OF MONTHLY DEATHS FROM SCARLET FEVER AND THE AVERAGE MONTHLY WIND VELOCITY, FOR THE YEARS, 1898-1912, INCLUSIVE.



MEASLES, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

GENERAL PREVALENCE.

Probably the most frequent and most contagious of the eruptive diseases is measles. It usually occurs among children under five years of age. Measles is usually regarded as a disease of little consequence; but this is an error. In children not previously in good health it may prove fatal, generally by inducing pneumonia and other complications of the respiratory tract. In order to prevent the spread of this disease it should be remembered that the period of invasion and eruption is most dangerous, hence the necessity of early recognition and isolation. The restrictive and preventive measures should be rigidly enforced.

The general prevalence of this disease for each of the years, 1890-1912 is shown in Table 40. It will be seen by this table, by comparing the average death rates for the various five-year periods, that there is a downward trend in its prevalence, also that the death rate in 1912 is the lowest of any year since 1902.

TABLE 40.—*The prevalence of measles, in Michigan, during the twenty-three years, 1890–1912.*

Years.	Cases.*	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1890	11,911	140	1.2	6.7
1891	12,173	149	1.2	7.0
1892	3,830	76	2.0	3.5
1893	7,334	119	1.6	5.4
1894	10,518	55	.5	2.5
1895	3,870	12	.3	.5
1896	15,409	156	1.0	6.8
1897	32,543	159	.5	6.8
Average, 1890–1897	12,199	108	.9	4.9
1898	11,614	131	1.1	5.6
1899	12,005	187	1.6	7.8
1900	20,403	342	1.7	14.1
1901	4,629	79	1.7	3.2
1902	11,978	238	2.0	9.6
Average, 1898–1902	12,126	195	1.6	8.1
1903	8,941	176	2.0	7.0
1904	10,386	194	1.9	7.7
1905	6,061	123	2.0	4.8
1906	7,403	251	3.4	9.7
1907	12,139	256	2.1	9.8
Average, 1903–1907	8,986	200	2.2	7.8
1908	4,775	121	2.5	4.6
1909	9,047	270	3.0	10.1
1910	13,934	251	1.8	8.9
1911	9,639	200	2.1	7.0
1912	2,834	118	4.2	4.1
Average, 1908–1912	8,046	192	2.4	6.9

*From many localities only the fatal cases were reported, so that the figures in this column do not represent the number of cases that actually occurred.

THE SEASONAL PREVALENCE OF MEASLES.

The months in which measles is uncommonly prevalent are March, April and May and least prevalent during the months of August, September and October. The prevalence of this disease is based upon the average number of deaths occurring in each month during the years, 1898-1912. These figures are contained in Table 41.

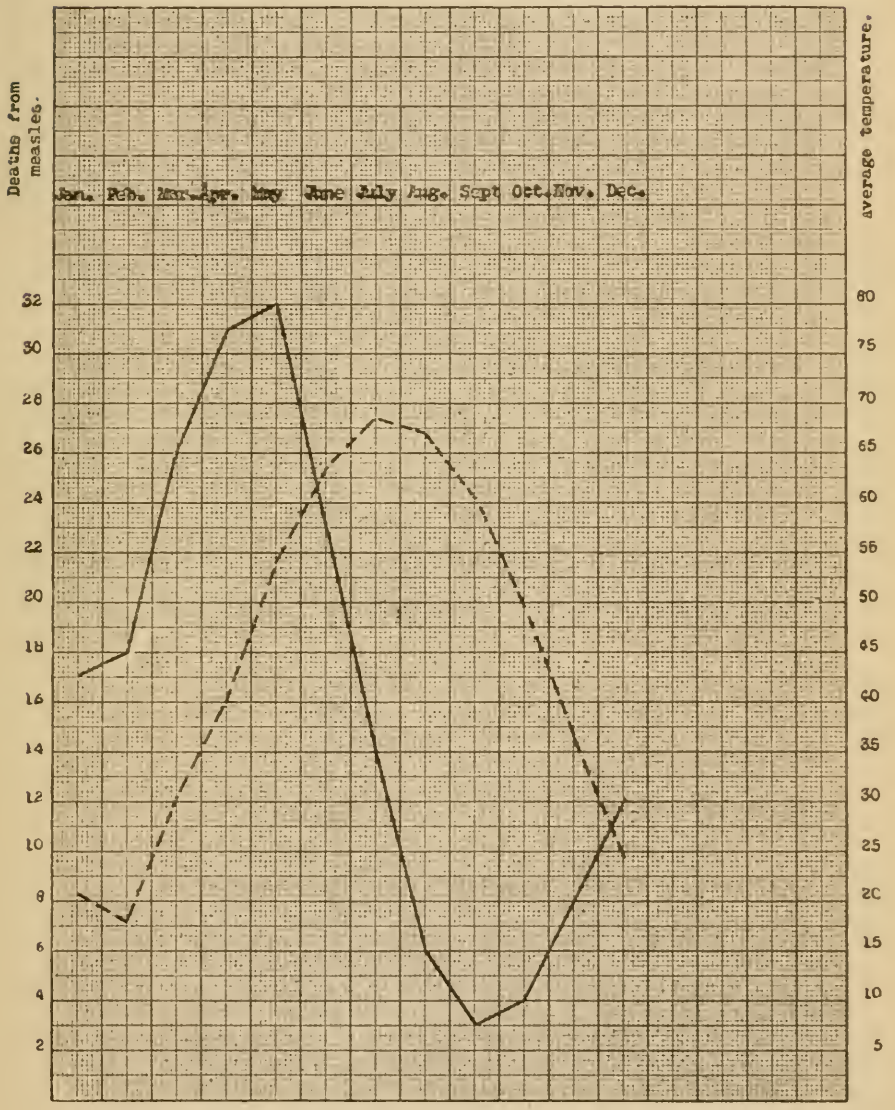
The following diagram illustrates the figures in this table by showing the relation between measles and temperature.

TABLE 41.—*Showing the seasonal prevalence of measles, as indicated by the average number of deaths occurring in each month, in Michigan, during the years, 1898–1912, inclusive.*

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average number of deaths per month.....	17	18	26	31	32	23	14	6	3	4	8	12

DIAGRAM SHOWING THE AVERAGE NUMBER OF MONTHLY DEATHS FROM MEASLES AND THE AVERAGE MONTHLY TEMPERATURE, DURING THE YEARS, 1898-1912, INCLUSIVE.

MEASLES ————
TEMPERATURE – – – –



SMALLPOX, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

GENERAL PREVALENCE.

During the year 1912, smallpox was reported present in 635 households in this State, with an aggregate of 1,127 cases, including 3 deaths.

As may be seen by Table 44, smallpox was more prevalent in 1912 (as indicated by the number of reported cases) than in 1911, although the fatality of the disease in 1912 was less than for the two preceding years.

TABLE 42.—*The prevalence of smallpox, in Michigan, during the thirty-one years, 1882–1912.*

Years.	Cases.	Deaths.	Deaths per 100 cases.	Deaths per 100,000 population.
1882	589	159	27.0	9.1
1883	29	2	6.9	.1
1884	22	3	13.6	.2
1885	27	6	22.2	.3
1886	24	7	29.2	.4
1887	4	0	.....	.....
1888	42	6	14.3	.3
1889	57	4	7.0	.2
1890	2	0	.....	.....
1891	3	0	.....	.....
1892	1	1	100.0	.05
1893	10	3	30.0	.1
1894	285	60	21.1	2.7
1895	187	47	25.1	2.1
1896	38	16	42.1	.7
1897	15	0	.....	.....
Average, 1882–1897	83	19	23.5	1.0
1898	32	1	3.1	.04
1899	139	6	4.3	.3
1900	694	9	1.3	.4
1901	5,088	31	.6	1.3
1902	7,086	40	.6	1.6
Average, 1898–1902	2,608	17	.7	.7
1903	6,341	33	.5	1.3
1904	5,753	24	.4	.9
1905	2,985	74	2.5	2.9
1906	1,240	3	.2	.1
1907	1,712	8	.5	.3
Average, 1903–1907	3,606	28	.8	1.1
1908	2,306	8	.3	.3
1909	1,533	4	.3	.2
1910	3,319	120	3.6	4.3
1911	898	9	1.0	.3
1912	1,127	3	.3	.1
Average, 1908–1912	1,837	29	1.6	1.0

THE PREVALENCE OF SMALLPOX IN URBAN AND RURAL LOCALITIES.

By Table 43 it will be seen that while smallpox, on the average, is more prevalent (as indicated by the case rate) in rural districts compared with urban, still the case rate in 1912 was not only less in the rural localities compared with the urban, but the per cent of decrease was much greater.

By Table 43A, it may be seen that, in 1912, the urban localities that showed much higher case rates from smallpox than the case rate for the entire State for that year (38.8 per 100,000 population), were: Hillsdale, Jackson, Kalamazoo, Monroe, Sault Ste. Marie and Wyandotte.

TABLE 43. — *The prevalence of smallpox in urban and rural localities, in Michigan, as indicated by the case rate per 100,000 population in the several groups, for each of the years 1904–1912.*

Localities—Grouped according to density of population.	Cases per 100,000 population.									
	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	Average 1904—1911	1912.
Cities over 50,000	22.5	71.8	11.8	43.6	45.4	16.4	62.5	5.2	34.3	32.0
Cities from 25,000 to 50,000	414.4	290.8	38.7	76.9	101.6	17.5	208.0	30.4	131.7	59.5
Cities from 10,000 to 25,000 and Calumet township	179.1	63.7	24.5	66.2	114.9	87.3	58.5	19.3	77.6	6.5
Cities and villages from 5,000 to 10,000.	203.0	111.1	8.5	63.1	46.6	81.2	113.3	18.1	77.8	28.0
Cities and villages under 5,000	210.4	129.3	77.4	73.8	86.8	63.5	132.9	47.0	103.6	75.5
Total urban	165.4	114.1	34.4	61.6	72.4	47.4	103.3	21.9	76.2	42.5
Rural localities (townships)*	280.0	119.7	63.4	70.0	104.7	60.4	138.6	45.1	113.1	33.6

*Exclusive of Calumet township, which, for the purpose of this study, is included in third group of urban localities which have corresponding populations.

TABLE 43A.—*The prevalence of smallpox in 1912, and preceding years, in each of the principal localities included in the first four groups in Table 43.*

Localities.	1912.			Average, 1904–1911.		
	Population.*	Cases.	Cases per 100,000 inhabitants.	Population.*	Cases.	Cases per 100,000 inhabitants.
Adrian	10,791	1	9.3	11,184	1	8.9
Albion	6,130	0	.....	5,383	6	111.5
Alpena	12,808	0	.....	12,763	5	39.2
Ann Arbor	14,890	0	.....	14,699	6	40.8
Battle Creek	26,285	1	3.8	24,751	33	133.3
Bay City	46,674	0	.....	41,817	90	215.2
Benton Harbor	10,013	0	.....	7,440	.1	1.3
Boyne City	6,140	0	.....	3,924	.6	15.3
Cadillac	8,869	1	11.3	7,714	4	51.9
Calumet Township	21,079	0	.....	18,548	10	53.9
Cheboygan	6,902	0	.....	6,878	28	407.1
Coldwater	5,852	0	.....	6,154	6	97.5
Detroit	515,158	212	41.2	376,881	52	13.8
Dowagiac	5,316	5	94.1	4,707	7	148.7
Escanaba	13,893	0	.....	12,392	8	64.6
Flint	46,439	12	25.8	22,129	50	225.9
Grand Haven	6,062	0	.....	5,639	7	124.1
Grand Rapids	118,189	1	.8	104,104	53	50.9
Hancock	9,962	0	.....	7,768	0	.....
Hillsdale	5,065	8	157.9	5,170	3	58.0
Holland	10,998	0	.....	9,930	7	70.5
Houghton	5,369	0	.....	5,016	0	.....
Iron Mountain	9,426	0	.....	8,448	.5	5.9
Ironwood	13,755	0	.....	10,925	.1	.9
Ishpeming	12,723	0	.....	11,082	.1	.9
Jackson	33,477	86	256.9	27,017	19	70.3
Kalamazoo	42,655	45	105.5	34,918	11	31.5
Lansing	34,880	6	17.2	25,020	20	79.9
Laurium	8,831	0	.....	8,836	0	.....
Ludington	9,756	0	.....	7,810	7	89.6
Manistee	12,272	0	.....	11,892	21	176.6
Marquette	11,782	0	.....	11,177	.9	8.1
Menominee	10,311	0	.....	10,130	2	19.7
Monroe	7,148	8	111.9	6,844	2	29.2
Mt. Clemens	7,907	2	25.3	7,520	2	26.6
Muskegon	25,117	2	8.0	21,792	23	105.5
Negaunee	9,014	0	.....	7,183	3	41.8
Niles	5,328	0	.....	4,947	4	80.9
Owosso	9,804	2	20.4	9,489	21	221.3
Pontiac	15,748	1	6.4	12,395	3	24.2
Port Huron	18,475	5	27.1	20,121	14	69.6
Saginaw	51,810	6	11.6	49,686	121	243.5
St. Joseph	6,141	0	.....	5,567	.4	7.2
Sault Ste. Marie	13,006	7	53.8	12,184	8	65.7
Three Rivers	5,458	0	.....	4,397	1	22.7
Traverse City	12,408	0	.....	12,377	10	80.8
Wyandotte	9,241	20	216.4	6,314	1	15.8
Ypsilanti	5,778	1	17.3	7,318	5	68.3

*Estimated for intercensal years.

POLIOMYELITIS, IN MICHIGAN, IN 1912 AND PRECEDING YEARS.

The following table shows the general prevalence of this disease during the three years 1910-1912:

Years.	Cases.	Deaths.	Deaths per 100,000 population.
1910	104	72	2.6
1911	68	35	1.2
1912	78	33	1.1

From the above death rates it would seem that this disease is on the decrease, although the number of reported cases in 1912 exceeded those of 1911.

AGES AND SEX OF THOSE TAKEN SICK WITH POLIOMYELITIS IN 1912.

The following table shows the influence of age and sex in this disease in 1912, as indicated by those of known ages who were taken sick with this disease. The proportion of those taken sick under five years of age was 56 per cent and under ten 70 per cent, and there was considerable excess in number of those taken sick in the male sex especially over 15 years of age.

	All ages.	0-	1-	2-	3-	4-	5-	10-	15-	20-	25-	35-	45-	55-	65-
Males	38	2	2	5	6	5	6	5	1	1	1	0	1	1	2
Females	39	1	9	3	7	3	5	9	....	1	1	....	....	....	....

AGE AND SEX OF THOSE WHO DIED FROM POLIOMYELITIS IN 1912.

	All ages.	0-	1-	2-	3-	4-	5-	10-	15-	20-	25-	35-	45-	55-	65-
Males	18	2	1	2	2	1	1	3	1	....	1	....	1	1	2
Females	15	1	5	2	2	....	2	2	....	1	....	....	....	....	....

Of those who died 55 per cent were under five and 64 per cent under 10 years of age. The males furnished all deaths over 20 years of age.

AGES AND SEX OF THOSE WHO RECOVERED FROM POLIOMYELITIS IN 1912.

	All ages.	0-	1-	2-	3-	4-	5-	10-	15-	20-	25-	35-	45-	55-	65-
Males	19	....	1	3	3	4	5	2	....	1	....	....	....	....	....
Females	25	....	4	1	6	3	3	6	....	....	1	1	....	....	....

By the above table it may be seen that of those who recovered from this disease 57 per cent were under 5 and 75 per cent under 10 years of age.

SEASONAL PREVALENCE OF POLIOMYELITIS IN 1912 AS INDICATED BY THE NUMBER OF PERSONS TAKEN SICK IN EACH MONTH.

Months.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec
Number taken sick	1	1	2	.....	.....	1	2	17	26	8	3	1

By the figures contained in the above table it will be seen that this disease was most prevalent in 1912 during the months of August and September, 69 per cent of the cases having begun in those two months.

CHICKEN-POX (VARICELLA), IN MICHIGAN, IN 1912.

During the year 1912 chicken-pox was reported present in 21 localities in the State, 113 households being infected, with a total of 165 cases, one of which proved fatal.

ERYSIPELAS, IN MICHIGAN, IN 1912.

During the year 1912 reports were received relative to 203 cases of erysipelas in this State, 120 of which proved fatal.

MUMPS (PARATITIS), IN MICHIGAN, IN 1912.

During the year 1912, 32 cases of mumps were reported to this Department, no deaths resulting.

TETANUS (LOCK-JAW), IN MICHIGAN, IN 1912.

During the year 1912 there were reported to this Department fifteen cases of tetanus, fourteen of which proved fatal.

Of the 15 cases in which a source of infection was stated, three were due to wounds from rusty nails, two to cuts in fingers, and one each to the following causes: wound from blank cartridge, wound in leg, leg crushed by train, hand injured in corn husker and sliver in finger.

In eight instances, the average period of incubation (from time of wound or injury until tetanus developed) was 9.1 days.

In nine instances the average duration of sickness was 4.2 days.

DISEASES OF ANIMALS DANGEROUS TO MAN, IN MICHIGAN, IN 1912.

Whenever information is received at this office of the occurrence of an outbreak of any disease of animals, which, by reason of its communicability, may be considered dangerous to man, efforts are made to learn all facts relative to such outbreaks. The matter is reported to the State Live Stock Sanitary Commission, and the attention of the health officials of the locality, where the disease is reported present, is called to the fact of its reported prevalence, and they are requested to take immediate measures for the prevention of its spread, by establishing and maintaining quarantine, over the diseased animals until relieved by the State Live Stock Sanitary Commission.

During the year 1912, the two following diseases of this character were reported to this Department:

RABIES (HYDROPHOBIA) IN MICHIGAN IN 1912.

During the year 1912 five outbreaks of rabies (hydrophobia) among animals were reported to this Department. Two persons were bitten, resulting in their death.

GLANDERS (FARCY) IN MICHIGAN IN 1912.

One case of glanders (farcy) among horses was reported to this Department during the year 1912

INDEX.

INDEX.